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ABSTRACT

In an effort to evaluate the impact of the 1972-73 Navajo Generating Station at Page, Arizona and the strip mine at Black Mesa on the Navajo Reservation, areas adjacent to each of these operations were surveyed (N=134 and 60 respectively) and compared with two control populations (N=60 from the rural area of Red Lake and 58 from the wagework area of Tuba City). Attempting to differentiate between real lifestyle transformations within the affected areas and rural to urban migration, comparisons were made in terms of: (1) Demography (age and education of household heads and spouses; marriage patterns; religious affiliation; household size and composition; length of residence; location of prior residence); (2) Social Organization (camp size and composition; community residence after marriage; livestock ownership and patterns of cooperation beyond the camp; hauling wood and water; cooperative arrangements for herding sheep; stock permits); (3) Economics (income; wage, unearned, livestock, agricultural, and craft income; major expenses; commercial transactions). Results indicated: incomes, levels of employment, and levels of education were all higher in the impact area around Lake Powell, while levels of unemployment and welfare expenditures were lower; household heads were younger and family groups were smaller in the impact areas; rural populations were unaffected; observed differences were not so much the result of transformation as the effect of migration of younger, more skilled workers. (JC)

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the effects of power production and strip mining on local navajo populations

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U.S. DEPARTMENT OF HEALTH
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LAKE POWELL RESEARCH PROJECT BULLETIN

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THE EFFECTS OF POWER PRODUCTION AND STRIP MINING ON LOCAL NAVAJO POPULATIONS

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LAKE POWELL RESEARCH PROJECT

The Lake Powell Research Project (formally known as Collaborative Research on Assessment of Man's Activities in the Lake Powell Region) is a consortium of university groups funded by the Division of Advanced Environmental Research and Technology in RANN (Research Applied to National Needs) in the National Science Foundation.

Researchers in the consortium bring a wide range of expertise in natural and social sciences to bear on the general problem of the effects and ramifications of water resource management in the Lake Powell region. The region currently is experiencing converging demands for water and energy resource development, preservation of nationally unique scenic features, expansion of recreation facilities, and economic growth and modernization in previously isolated rural areas.

The Project comprises interdisciplinary studies centered on the following topics: (1) level and distribution of income and wealth generated by resources development; (2) institutional framework for environmental assessment and planning; (3) institutional decision-making and resource allocation; (4) implications for federal Indian policies of accelerated economic development of the Navajo Indian Reservation; (5) impact of development on demographic structure; (6) consumptive water use in the Upper Colorado River Basin; (7) prediction of future significant changes in the Lake Powell ecosystem; (8) recreational carrying capacity and utilization of the Glen Canyon National Recreational Area; (9) impact of energy development around Lake Powell; and (10) consequences of variability in the lake level of Lake Powell.

One of the major missions of RANN projects is to communicate research results directly to user groups of the region, which include government agencies, Native American Tribes, legislative bodies, and interested civic groups. The Lake Powell Research Project Bulletins are intended to make timely research results readily accessible to user Groups. The Bulletins supplement technical articles published by Project members in scholarly journals.

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ABSTRACT

In this bulletin the economic and social conditions of Navajos living adjacent to Lake Powell, the Navajo Generating Station, and the Black Mesa coal mine are compared with those of populations living at some distance from these recent economic developments. The material presented is descriptive and discussion is limited to comparisons of whole populations. More analytic, multivariate analyses will be presented in future bulletins.

Populations in the "impact" areas, those areas where there are new economic developments, differ from those in the unaffected areas in a number of ways. Incomes, levels of employment, and levels of education are all higher in the impact area around Lake Powell. Levels of unemployment and welfare expenditures are correspondingly lower in these populations as well. Household heads are younger and family groups are smaller in the impact areas than they are in the more rural, pastoral regions.

There are indications, however, that observed differences are not so much the result of transformation of local populations as they are the effects of migration of younger, more skilled workers into new settlements in the vicinity of the Navajo Generating Station and elsewhere near the town of Page, Arizona. The rural populations have remained unaffected and are still largely dependent upon welfare and sporadic wagework.

THE EFFECTS OF POWER PRODUCTION AND STRIP MINING ON LOCAL NAVAJO POPULATIONS

INTRODUCTION

The Lake Powell Research Project (LPRP) has concentrated much of its effort upon problems related to the development of the water resources of the Upper Colorado River Basin, especially in the Lake Powell region (Figure 1). This has involved study of decisions leading to the impoundment of waters at Lake Powell, subsequent construction of a coal-fired powerplant (the Navajo Generating Station) in the immediate vicinity of the lake, and strip mining of coal on Black Mesa. These activities, involving Navajo water rights, mineral resources, and reservation lands, have perforce made the Navajo Tribe a participant in the economic development of the region. The social science subprojects of the LPRP have been particularly directed toward determining the degree to which local populations will benefit from continuing economic development in the region.

The initial task of the LPRP Anthropology Subproject has been to study the current economic and social conditions of Navajos living in areas adjacent to Glen Canyon Dam, the Navajo Generating Station, and the strip mine on Black Mesa. The subproject has sought to identify changes directly caused by these new developments.

Between August 1972 and November 1973, 314 extensive household interviews were conducted to obtain information on 364 demographic, social, and economic variables. In addition to the population of the impact areas around the coal mine on Black Mesa and the powerplant near Page, Arizona, two populations not immediately affected by these developments were surveyed (those of Red Lake and Tuba City). It was thought that these populations, the first rural and the second more involved in wagework, would reveal what changes in the region were occurring independently of the large-scale economic developments of interest. In view of the lack of detailed baseline data for the impact areas prior to the creation of Lake Powell, it is very important to distinguish between (1) the overall effects on the Navajo Reservation of federal spending and unplanned change in general, and (2) the specific effects of large-scale new developments which Navajo planners hope will substantially modernize the reservation economy. Surveys of the control communities provide information which enables this distinction to be made. In addition, it was hoped that economic and social conditions in the control communities could be considered representative of those conditions existing prior to the initiation of strip mining and powerplant construction.

In each area sampled, an attempt was made to survey households close to the sources of wagework as well as those at some distance from the job sites. In the Page area, for instance, interviews were conducted in households in the town of Page, in the powerplant dormitories, in the transitional settlements along Route 89, at the Lechee Chapter House south of Page, and, finally, in the surrounding, more rural area of the Lechee Grazing District. A similar range of subpopulations was surveyed in the remaining two control sample areas (Tuba City and Red Lake).

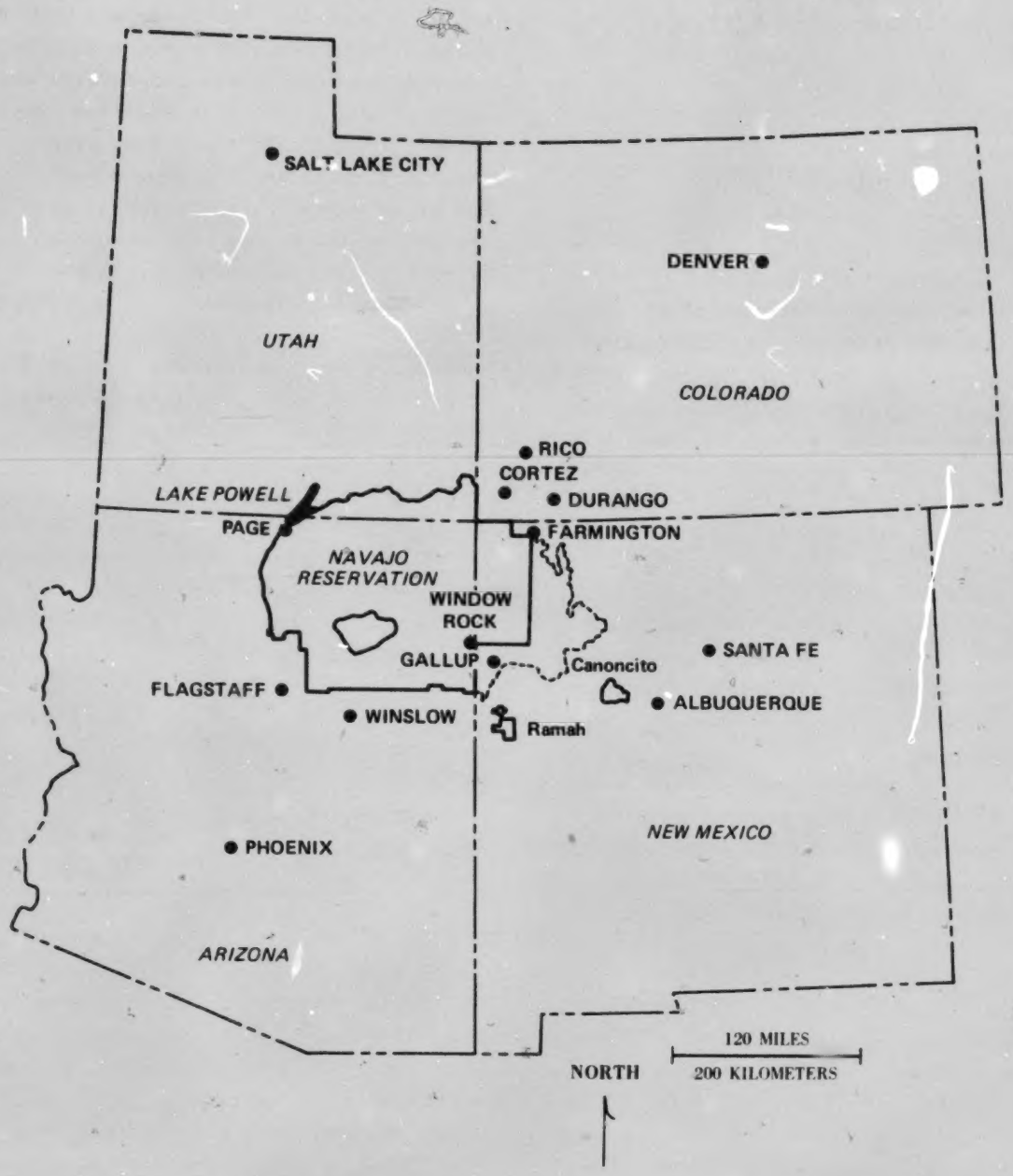

Figure 1: Index Map Showing Location of the Navajo Reservation and Lake Powell

Although the ultimate goal of the present research is to identify the nature and causes of change, the study reported in this bulletin is synchronic in that it treats a variety of populations at the same point in time. Consequently, it is difficult not only to identify with certainty the causes of specific changes, but also to distinguish between phenomena of recent origin and those that have existed for some time. Until a restudy of these areas can be made after some time has elapsed, the data must be interpreted with the utmost caution.

Henderson and Levy (1975) reviewed previous community studies of the Navajo made since 1936. General directions of change among the Navajo were identified. It was found that Navajo communities differed from each other both within and among regions, a circumstance that makes it difficult to establish even a tentative baseline for the areas under study. Moreover, many of the features once thought to have been characteristic of reservation life after the shift away from pastoralism and towards wagework were found to have actually been in existence prior to stock reduction.

Scholars generally described the Navajo of the pre-stock-reduction period, before 1936, as living in extended family units composed of matrilineally related women, their husbands, and their children. It was also presumed that the society practiced matrilocal residence and reckoned descent matrilineally. The extended family moreover was believed to have provided sufficient manpower for sheepherding and some agricultural enterprises. Virtually all Navajo were thought to have owned flocks large enough to ensure survival of the extended family. There was general agreement that the stock-reduction program forced many people to earn a living by combining seasonal wagework with marginal stockraising activities. Whenever a community was found to have a large proportion of independent nuclear families, as well as extended families which were not matrilocal, observers immediately concluded that these supposed deviations were recent responses to the shift toward wagework.

One of the first things noted in our survey of previous Navajo community studies was that the proportion of households not owning stock was considerable even in the early years of the present century. As early as 1881, when the railroad was being built along the southern border of the reservation, there was no difficulty in recruiting Navajo laborers. This, according to Aberle, "...suggests that there was always a fair sized group whose livestock and farm holdings were small enough to make other forms of income desirable and to make absence from home possible" (Aberle 1974:102). In 1915, 24 percent of all families in the Southern Navajo Reservation had no sheep (Aberle 1974:102). Similarly, the proportion of families that were extended and matrilocal was as low as 11 percent in the isolated Navajo Mountain Community in 1938, as compared with 31 percent in Sheep Springs near Gallup, New Mexico, in 1965. In 1936, 53 percent of all Navajo families were neolocal, while in 1962, only 8 percent of all Gap-Cedar Ridge area families were neolocal (Henderson and Levy 1975: Appendix Table 3).

In order to assert that a presently observed high proportion of neolocality is a recent change, one must have earlier data from the same community for comparison. And in order to say that a rise in the proportion of neolocality is due to

an increased reliance upon wagework, one must have evidence of a rise in wage income during the same time period in the same community, and one must be able to demonstrate that it is the wageworker who lives neolocally and not the pastoralist.

The control populations of Red Lake and Tuba City were studied earlier by Levy in 1960 and again by Levy and Kunitz in 1966. A portion of the Black Mesa sample used for the present study lives in the Shonto area which was studied by Adams in 1955 and by Ruffing in 1971. Some earlier data are also available for the Page area which was studied by Wagner in 1969. These prior studies provide information that is useful in estimating the direction and magnitude of change in the study area.

The material presented in this bulletin is, however, descriptive. Analysis is limited to comparisons of whole populations (ecological comparisons). In cases where the more wagework-oriented populations differ from the more rural pastoralists in expected ways, some tentative suggestions about possible causes for change are made. Throughout, however, the reader is cautioned to refrain from making causal inferences.

Subsequent bulletins will present further analysis of the data by stratifying the present samples and using the appropriate statistics. These bulletins will consider in more detail the questions raised here. Data from the detailed studies of Shonto made by Adams and Ruffing will be used in future analysis. After documentation of diachronic processes observed in Shonto, a stochastic model will be applied to the synchronic data for the other areas, so that it will be possible to infer causes for observed changes.

The Navajo Tribe has entered into agreements with power coroporations in order to realize some long-range economic goals. Though several LPRP subprojects are studying overall developmental problems of the tribe, the present study deals with the impact of specific developments upon the local Navajo populations which comprise but a fraction of the tribal population currently estimated to be in excess of 140,000. These impacts initially will include the consequences of considerably enlarged earned incomes for local Navajos, as well as those resulting from a larger number of locally available jobs.

Even in this restricted arena, however, it is not yet possible to observe directly the state of steady employment envisioned by planners and tribal leaders. Construction of the Glen Canyon Dam lasted only six years. With the completion of the project, Navajo and Anglo construction workers left the area. Construction of the Navajo Generating Station was underway during the time of our interviewing, and mining activity on Black Mesa had just begun during the year our study was made. When the construction of the powerplant, the railway transporting coal from the mine to the plant, and the paved road from Page to Kaibeto are completed, the number of jobs available in the area will decrease appreciably. The course of future development in the area is not yet clear. Presently, local Navajos are responding to a boom-bust economy rather than to sustained economic development of a local area. The Navajos are well aware of the temporary nature of jobs associated with construction. The adjustments they make in living arrangements, spending patterns, and the like may be quite different from those they might make if more permanent employment were available.

The Navajo Tribe is considering entering into contractual arrangements with two major corporations to construct up to eight coal-gasification plants in the eastern area of the reservation. If staged construction over a period of years and maintenance of a large operating staff are actually realized, the Navajo will consider these developments as permanent features in their lives and will react accordingly. Extrapolation of conclusions drawn from the experiences in the Page area to longer term developments must be made with great caution.

Any projections for the future must also take into account the differences in the type of development contemplated and the different characteristics of the local populations involved. The Navajo Generating Station at Page has involved a construction phase followed by a small-scale maintenance operation. The Black Mesa coal-mining operation is projected to employ a constant number of workers over a 50-year period. The dam and generating station were built in a virtually unpopulated area on the reservation border. By contrast, Black Mesa is a relatively densely populated but isolated area that has an adequate supply of local Navajo labor.

With these limitations in mind, we now consider what the Navajo Tribe hopes to achieve by developing its coal and water resources. These goals have been presented in The Navajo Nation Overall Economic Development Program (Navajo Tribe 1974).

In 1972, Navajo annual per capita income was in the neighborhood of $900, while the national average was $3,900. The level of unemployment was about 35 percent of the work force (Navajo Tribe 1974:4-5). One might expect that major economic developments would initially be realized in the form of an increased Navajo payroll. Employment levels would rise, and expenditures for social welfare would decline.

The distribution of Navajo income has been inequitable. In 1969, 20 percent of all Navajo workers received 54 percent of the total income, while the poorest 20 percent of the workers received only 2 percent of the income (Robbins 1975:5). A massive infusion of jobs from large-scale construction and mining activities may provide opportunities for those who have had the least access to employment.

Demographically, the Navajo population resembles that of a Third World or pre-industrial nation. Not only is the population growing rapidly, but family size also tends to be larger than the national average. Thus, a typical Navajo family head must earn more than his non-Indian counterpart in order to attain the same per capita income. A general expectation held by most observers of industrialization is that with the transition from a subsistence to a wage economy, the need for large extended families disappears. In time, the independent nuclear family becomes the predominant form of household and the number of children per parent couple declines. Currently, the Navajo population is increasing at a rate between 2.4 and 3.3 percent annually. Existing resources are strained and new job opportunities have not increased sufficiently to provide jobs for the growing numbers of young adults entering the labor market each year.

At the present time, with some major exceptions, stockraising does not even provide a subsistence for the majority of

Navajos with sheep or cattle. The reservation land is overgrazed and the market for lamb and wool is depressed. In the absence of more lucrative occupations, however, it is a necessary subsistence activity. According to Kunitz (1976), the Navajos of the eastern half of the reservation are more involved in wagework, have a higher income from commercial, agricultural, and livestock activities, a higher proportion of the population with livestock permits, and less overgrazing than do the Navajos living in the western half of the reservation. It appears that a decreased reliance on stockraising allows the average family to keep smaller herds and use some of their cash income to purchase stock feed. Consequently, there is less destruction of the grazing land and more opportunity to use the livestock for a cash income rather than to rely on it for immediate nutritional needs.

Some indications thus suggest that increased job opportunities in the western portion of the reservation will lessen the pressure on grazing resources and will actually allow for increased income from stockraising. Currently, in the areas we have studied, only a small proportion of all families derive a substantial part of their income from livestock.

Only the immediate benefits to be realized from increased job opportunities have been cited above. Of course, a number of long-range economic goals are envisioned by the tribe, but because these depend upon long-term sustained developments, they are not discussed here. The interested reader may wish to consult The Navajo National Overall Economic Development Program (1974). Of some concern to us, however, are areas where local expectations diverge from, or even conflict with, tribal planning goals.

Restricted opportunity, in conjunction with rapid population growth, has led to considerable outmigration from the reservation in recent years. It is generally felt that the most skilled Navajos tend to leave the reservation permanently after their education is completed. The tribe hopes to stem this brain drain by increasing opportunities on the reservation. The return of skilled workers to reservation areas, while satisfying tribal needs, would tend to deny the less skilled local populations the opportunities they feel should be theirs. The powerplant and the strip mine are located in the most underdeveloped areas of the reservation. Should jobs be taken by more skilled Navajos coming from off-reservation or more distant reservation areas, the local populations will find themselves inundated by outsiders while they themselves remain on the welfare rolls. The extent to which this influx may be occurring in the areas studied should be of concern to tribal planners.

Economic and demographic transformations should ultimately lead to major changes in Navajo social organization. The general observation made in many developing parts of the world is that industrialization changes the social organization from one based upon reciprocal obligations among networks of kinsmen to one based upon association and contract.

Navajo social organization has been in a state of flux for over a century. During the reservation period, agricultural and pastoral pursuits have declined, and there has been a growing reliance upon wagework. Nevertheless, extended families, cooperation between kinsmen, and the matrilineal organization of descent, inheritance, and post-nuptial residence are still found on the reservation. In our opinion,

the persistence of these traditional elements of Navajo social organization along with other composite forms of the family is due to the fact that sources of wagework are uncertain and the economic returns from such work are generally minimal. In order to survive, the rural Navajo family must exploit several resources: wagework (whenever and wherever it is available), stockraising, welfare income, and craft production. Wagework is most often temporary or sporadic. Only the extended family can maintain livestock operations on any sizeable scale during the period when some of the males are away working. Even the younger, more educated couples who have gone to towns to live feel constrained to leave their flocks in the custody of rural kinsmen. Such arrangements perpetuate kin obligations and an enduring interest on the part of many full-time wage earners in economic conditions in their home areas.

To the extent that economic development is of the boom-and-bust type, the data should show evidence of both the persistence of traditional modes of cooperation as well as innovative and unusual modes not based upon the presumed traditional organizational principles of Navajo matrilocality and matrilineality. Several variables have been identified that will serve as indicators of changing social organization. These shifts will be discussed only briefly in the present report.

SAMPLING

During 1972 and 1973, the two major developments on the western Navajo Reservation were the construction of the Navajo Generating Station at Page, Arizona, and the strip mine on Black Mesa. The areas of Navajo settlement adjacent to each of these operations were selected for study by the Anthropology Subproject. In addition to the two impact areas, one rural area and one wagework settlement at some distance from the construction sites were chosen as control populations. Area-wide change, not directly attributable to the power developments, could be identified and distinguished from power-related impacts by comparing impact with control populations.

The three study areas are within the region generally known as the western Navajo Reservation (Figure 2). The area around Page and the powerplant comprises the northern part of the Kaibeto Plateau. Both Tuba City and Red Lake, sites of the control populations, are on the southern extremity of the Kaibeto Plateau. Black Mesa, to the east, is the northern rim of a large plateau north of the Hopi villages. Most of it, including the strip mine, is in the joint-use area of the original 1882 Executive Order Reservation of the Hopi Tribe. The western area is generally the most arid and least productive part of the Navajo Reservation. The population is more isolated, less well employed, and more reliant upon stockraising and social welfare than are communities in the eastern portion of the reservation. Rapid, large-scale, economic development in such an area should have immediate and measurable effects upon the local communities.

Vast expanses of unmapped terrain, dispersed and seminomadic settlement patterns, lack of paved roads, and the absence of detailed census enumerations make sampling of these populations remarkably difficult. The two impact areas were sampled on an availability basis. Random sampling and continuous area enumeration were possible in the control areas. Various subpopulations were

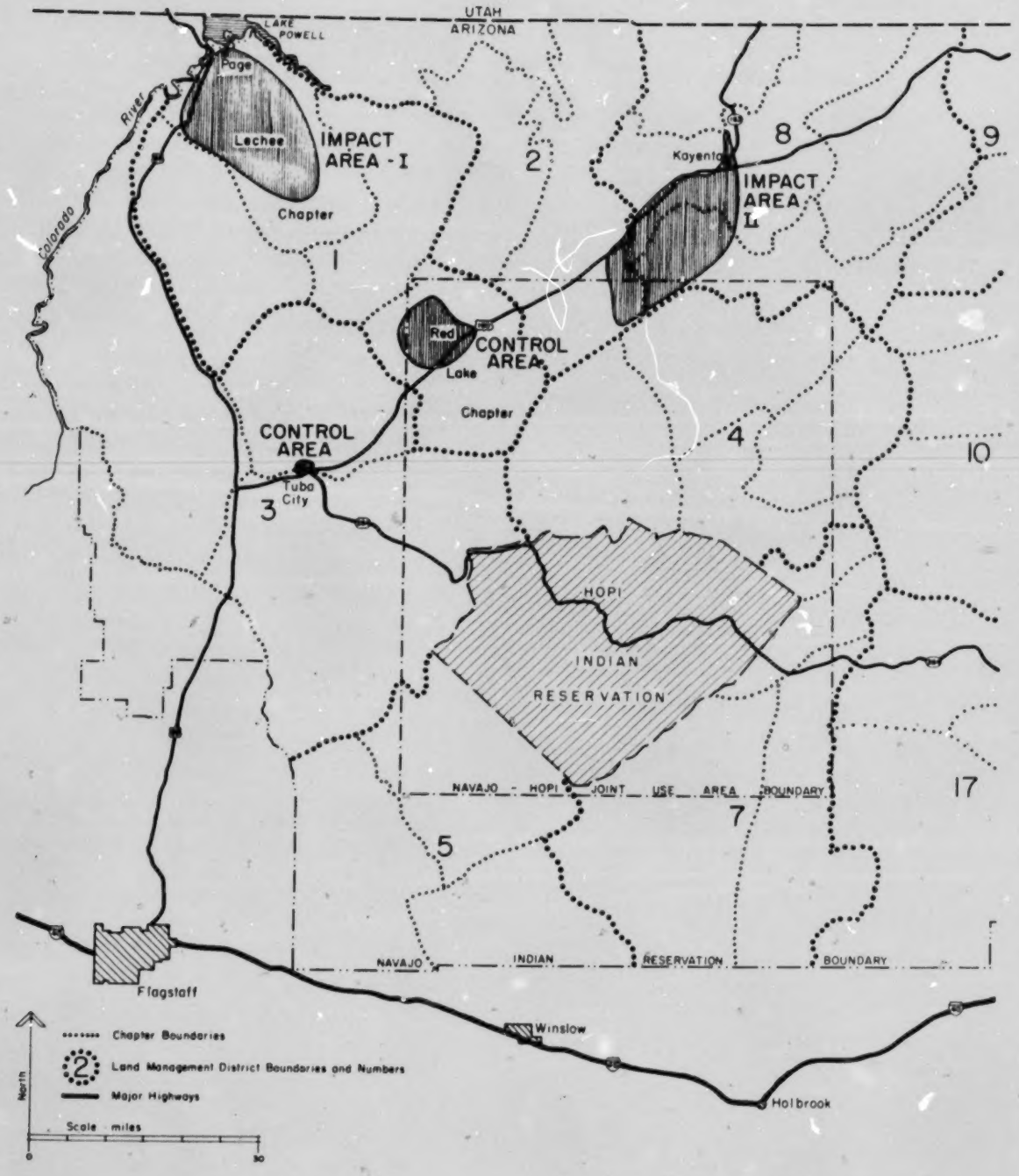

Figure 2: Western Navajo Reservation Showing Areas Sampled

identified within each area and these have been grouped in order from the most rural to the most urban.

The remaining portions of this section describe the study areas, the subsamples, and the sampling procedures utilized.

Impact Area I: Page-Lechee

The Lechee Chapter area was one of the most sparsely populated areas of the western Navajo Reservation prior to the construction of the Glen Canyon Dam. During the 1930s, prior to stock reduction, the area was utilized as a winter range by a number of Navajos with large stock holdings who lived around Kaibeto to the south during most of the year. Eight stock owners grazed over 5,000 head of sheep in the vicinity of Lechee Rock in 1937 (Sombrero 1937). Areas to the east and south around Tsai-Skizzi Rock and on the west side of Antelope Creek were also used for winter grazing by stockmen from Kaibeto and Red Lake (Figure 3).

In 1936, Land Management District 1, of which Lechee Chapter is only a small part, had a total population of 1,254. This district had the highest number of livestock per capita, 44.6 sheep units, as compared with Land Management District 2 (Shonto, Inscription House, and Navajo Mountain) which had only 31.2 sheep units per person (U.S. Department of Agriculture, Soil Conservation Service, Section of Conservation Economics 1938/39). The stockmen who used the Lechee area for winter range appear to have been wealthier than the average stock owner of District 1. Only 1 of the 8 stockmen near Lechee Rock owned less than 875 sheep units. The effect of stock reduction in District 1 is not well known, but it is safe to assume that it was devastating for an isolated population heavily dependent upon livestock. A few stock owners leased off-reservation land near Lee's Ferry or obtained permits to graze cattle on range controlled by the Bureau of Land Management.

In 1956, work began on the Glen Canyon Dam and the town of Page was built on Manson Mesa. U.S. Highway 89 was extended from Bitter Springs to Page, the Colorado River was bridged, and the highway was extended another 70 miles to Kanab, Utah. The isolation of the area abruptly came to an end.

The population of Page grew to 6,000 during the construction of the dam. Anglos and Navajos moved into the area to find jobs. According to Young (1958:136), about 10 percent of the 1,000 workers employed at the dam site were Navajo, and virtually all of these were unskilled.

The Lechee Chapter House was built on the reservation some five miles south of Page. In 1963, Levy conducted a survey of Navajo families who had settled by the Chapter House (Levy 1963). At that time there were only 7 households with a total population of 38.

Following the completion of the dam in 1963, the population of Page decreased to about 1,000, of which less than 100 were Indian. By 1970 the Page population had increased to about 1,430, and the Indian population had grown to comprise over 10 percent of the total. Wagner estimated that about 106 Navajo families were living in the larger Page-Lechee area in 1970 (Wagner 1975:81-82).

In 1968, the Navajo Tribe began negotiations with a consortium of utility

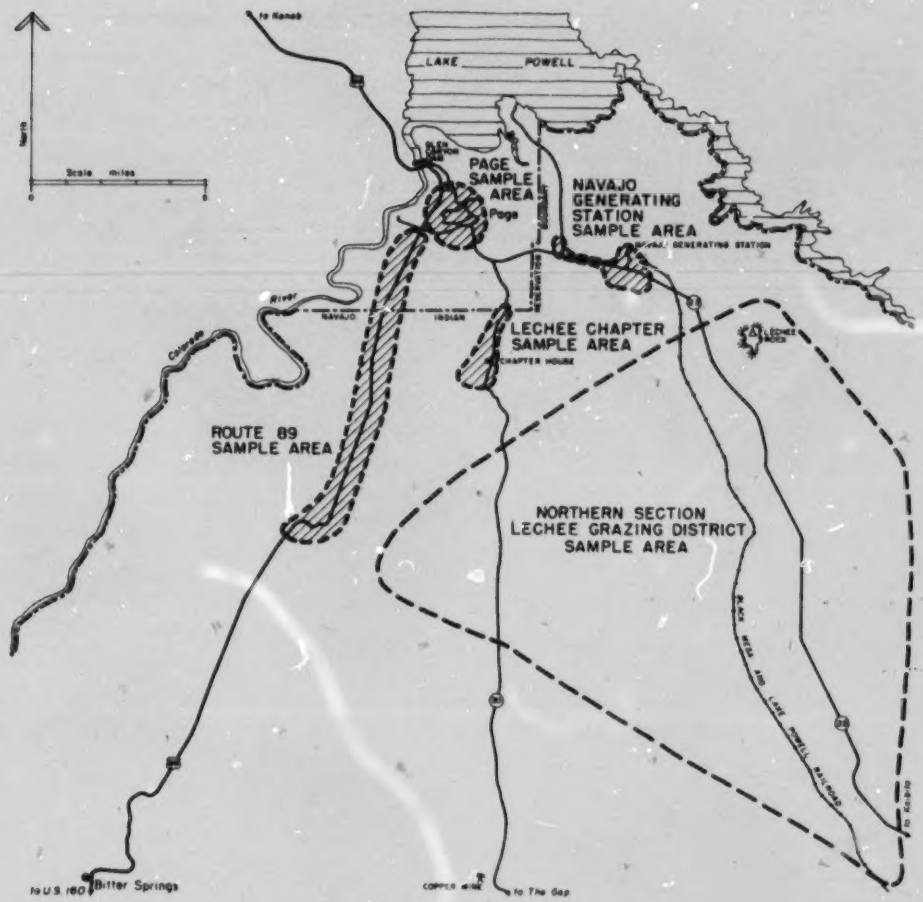

Figure 3: Impact Area I: Page-Lechee

companies that proposed building, on a site near Page, a powerplant with a generating capacity of more than 2,000 megawatts (MW). The site, leased from the tribe and located in the Lechee Chapter area, would utilize the water from Lake Powell for cooling purposes and coal from Black Mesa for fuel. The town of Page would house and service the construction workers and their families.

The final agreement between the tribe and the Salt River Project, the major investor, called for the preferential hiring of Navajo workers. Over 150 Navajos were expected to gain employment during the construction phase and from 15 to 20 were to be employed on a permanent basis. Unspecified supporting industries were to provide an additional 30 or 40 jobs for Navajos.

Construction of the Navajo Generating Station was begun in October 1970 by the Bechtel Corporation. Approximately 150 Navajos were hired as laborers. A well-educated, local Navajo was employed as a liaison officer to inform local Navajos of job openings.

Hiring reached a peak in 1973, when over 2,200 persons were employed. Approximately 440 of these were Navajo. In September 1972, Bechtel employed 274 Navajo construction workers. Of these, 44 percent were laborers, 27 percent were journeymen in skilled jobs, and 29 percent were apprentices in skilled tasks. Another major contractor employed 214 Navajos in construction projects related to the generating station and several smaller subcontractors also employed Navajos. In the summer of 1972, the Morrison-Knudsen construction firm employed 187 Navajos, 25 percent of whom were from the local area, to work on the Black Mesa & Lake Powell Railroad.

In response to these employment opportunities, Navajos moved into the area from a number of distant communities. Some commuted daily from as far away as Kayenta and Tuba City. Many camped in their trucks during the workweek and returned to their homes on weekends. Workers leaving families and flocks at home moved into dormitories at the powerplant, or into motels in Page. Entire families settled around the Lechee Chapter House and along Route 89 so that they could drive daily to work. A few families lived in Page proper, while many more lived adjacent to the town in a trailer camp that was administered by one of the construction companies. By 1973, the population of Page was estimated to be 9,000.

The presence of transient and commuter populations made it virtually impossible for researchers to define the target population. The Anthropology Subproject was prepared to survey approximately 100 families, which comprised the total Navajo population estimated by Wagner in 1970. Population growth was so rapid that the interviewer assigned to the Page area was not able to make an adequate assessment of the total population in each of the small areas settled by Navajos. The decision was made to interview as many household heads as possible in each subpopulation on an availability basis. These subsamples were quite different from each other and were treated as separate populations. The description of each settlement cluster and the sampling procedures follows. The more wagework-oriented groups are discussed first.

The Powerplant

In the Powerplant subsample of the present study, 31 household interviews were administered to heads of households.

The largest number of these, 20, were conducted in the dormitory of the Navajo Generating Station where single employees or married men away from home were housed. Originally it was hoped that all Navajos living in the dormitory at a given point of time could be interviewed. Within one week of obtaining the name list of 20 Navajos employed by the major contractors who were in the dormitory, it was found that 20 percent of those listed had left their jobs. Twenty percent of the men listed refused to be interviewed, and another 5 percent could not be contacted. The interviewers felt that refusals in the dormitory were from older men and that the sample might be biased toward younger workers. After the initial 10 interviews were completed, interviewing continued on an availability basis until a total of 20 interviews were obtained from the dormitory.

At the time of the study, 24 workers, singly or with their families, were living in trailers by Antelope Creek about two miles south of the powerplant. Eight interviews were conducted in this settlement. Twelve tent and shanty dwellings were found just across the road from the powerplant, and three interviews were administered in this settlement.

Single workers camping in their own cars were not interviewed, as they could only be found after dark and were not available during the normal working hours of the interpreters. About 20 vehicles were observed parking in the powerplant parking lot on a single night.

Page

Thirty-three interviews were conducted in Page. We estimate that this sample represents about one-third of all Navajo families in Page.

Few Navajos live in the settled residential areas. Only four interviews were completed within the town proper. The Bureau of Indian Affairs administers a low-cost housing section of Page where ten interviews were conducted. Another 11 interviews were completed west of Page in a large trailer camp administered by one of the construction companies.

A number of Navajos live in motels. The Navajos interviewed were either single or married men living away from home, and they were very much like those living in the dormitory. All motels were contacted and a total of eight interviews were successfully completed. There were six refusals. It was not possible to determine the total number of workers living in the motels because many men shared rooms and were not known to the managers. At least six individuals were identified by name but were not located.

Route 89

It is estimated that the 23 interviews completed among households located along a 10-mile stretch of Highway 89 south of Page represent about 50 percent of the total in this subsample. Both wage-workers and pastoralists lived in this area. Over 40 percent of all households had lived in the area for 9 or more years. These families tended to rely upon livestock. Another 40 percent, however, had come to the area between 1971 and 1973 specifically to seek work at the powerplant. The highway provides easy access to Page, and the greatest concentration of dwellings is within five miles of the town.

Lechee Chapter

The Lechee Chapter House was constructed just south of Page in the early 1960s. By 1963, running water, electricity, and sewer lines were brought to households settling by the chapter house. During the summer of 1973, a number of local families moved into a new, 25-unit Mutual Self-Help housing project. Some newcomers from other parts of the reservation rent homes in this settlement, but the vast majority of residents are indigenous and have lived for many years in the Lechee Grazing District. Approximately 50 percent (36) of the families were interviewed.

Lechee Grazing District

Only 11 interviews were administered among families living in the Lechee Grazing District proper. This is a rural, pastoral area, where most families graze sheep, are less involved in wagework, and have two or more dwelling sites. It is estimated that about 30 percent of all families living in the northern half of the grazing district were interviewed. The total population of the whole area is not known.

Summary

A total of 134 interviews were obtained from Impact Area I (Page-Lechee). Due to the rapid population growth and the constant movement of people into and away from the area, it was not possible to estimate the size of the target population. The heterogeneity of the population made it necessary to divide the total sample into subsamples for purposes of comparison. It is not known whether our grazing district subsample is representative of the whole grazing district.

Impact Area II: Black Mesa-Kayenta

Black Mesa is an isolated highland in the central portion of the Navajo Reservation. The Black Mesa strip mine operated by Peabody Coal Company opened in 1970. The coal is transported to the Mohave Power Plant in southeastern Nevada by slurry line and to the Navajo Generating Station near Page by an 80-mile electric railroad. Prior to development of the strip mine, there were no graded roads in the area, and the average family lived 10 to 15 miles from the nearest paved highway. The highway from Tuba City to Kayenta was not paved until 1960. To reach the highway, Black Mesa dwellers must descend from the rim of the plateau to the Klethla Valley on roads that are impassable during much of the winter. The nearest trading post is at Tsegi Canyon and the nearest government services are located at Kayenta (Figure 4).

Before the development of the strip mine, Black Mesa and the Lechee Grazing District were both isolated areas in which the inhabitants were heavily reliant on stockraising. They were, however, dissimilar in some important respects. The Lechee area was sparsely populated. It was inhabited by a few stockmen who had large flocks. During the 1930s, Land Management District 1 (Lechee-Kaibeto-Red Lake) had a population density of 0.8 persons per square mile, while Land Management District 4 (Black Mesa) had a density of 1.6 persons per square mile. There was more serious overgrazing on Black Mesa, and people were poorer there than they were near Lechee. In Land Management District 1 there was an average of 44.6 sheep units per capita. This figure is more than double the per capita holdings of Land Management District 4 at the same time (21.2 sheep units).

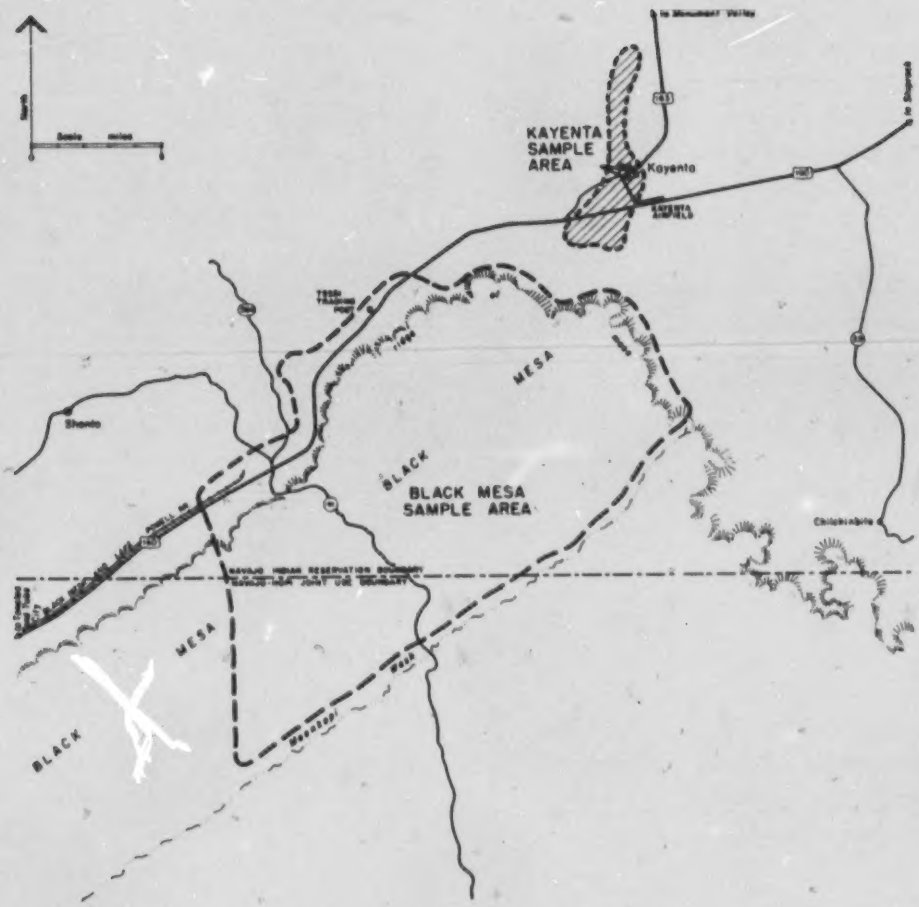

Figure 4: Impact Area II: Black Mesa-Kayenta

In 1973, District 4 was still more densely populated than was District 1 (6.4 versus 3 persons per square mile), and it was more seriously overgrazed. In 1970 there were approximately 30 sheep units per person in the Lechee Grazing District, between 5 and 8 units per person in the various areas of District 4, and only 3 units per person in Red Lake. The area around the strip mine (District 4) had a larger and poorer resident population than did Lechee. Clearly, sheep holdings in the rural areas of the western Navajo Reservation differ greatly.

In 1973, Peabody Coal Company employed at the strip mine approximately 200 workers of whom 180 were Navajo (Navajo Tribe 1974:24). Some effort was made by Peabody to employ as many local residents as possible. Navajos from Black Mesa and Kayenta took jobs at the mine and interviews were conducted in both these areas.

Black Mesa

Thirty-six household interviews were completed in an area surrounding the Black Mesa mine. The number interviewed represents about 65 percent of the households identified in the area. The refusal rate was 20 percent, and 14 percent of all identified households could not be contacted.

Interviews were obtained among households in an area from Moenkopi Wash, about five miles south of the mine site, northward to the Klethla Valley near Tsegi. Black Mesa residents living north of the Moenkopi Wash are related socially, politically, and economically to families living in Klethla Valley, while south of the wash, interaction is greater with people from Piñon. By interviewing in this socially homogenous area, we have probably underrepresented householders with jobs at the mine because approximately one-half of the households lived in the valley. Although many Navajos from Kayenta commute to work daily, and it would be possible for Klethla Valley residents also to commute, the more rural families of the valley tend not to work at the mine. Thus, while less than 50 percent of all household heads in the Black Mesa sample had mine-related jobs, some 80 percent of household heads living on the mesa worked at the mine.

Kayenta

Twenty-four interviews were completed in the settlement of Kayenta. Households in the government compound were not contacted. Of the 36 households approached, 12 refused the interview.

Kayenta is a center for federal and tribal agencies serving the northern portion of the Tuba City Sub-Agency. Although smaller than Tuba City, it nevertheless contains a police station, primary and secondary schools, an experimental farm, an Indian Health Service (IHS) Clinic, three trading posts, and a Holiday Inn motel. A growing Navajo population occupies shanties, trailers, and hogans just south of the government compound. There is also a trailer park owned by Peabody Coal Company and a federally subsidized housing project.

The Kayenta subsample was not intended to include a representative cross-section of the population. Instead, the interviewer consciously sought out mineworkers and their families. Interviews were conducted in the Black Mesa Trailer Park, the Kayenta low-rent housing project, the "hill" (a Navajo residential section including houses, trailers, and shanties) just south of the government compound,

and in the outskirts of Kayenta to the north and south.

Almost half of the household heads interviewed were not employed at the Black Mesa mine. They were included in the sample because they were relatives of the mineworkers interviewed. In the present study, the Kayenta sample is anomalous. Data for Kayenta, along with the other samples, are presented in our tables for comparative purposes. The reader is reminded that the data are not representative of the entire Navajo population of Kayenta. In subsequent studies that utilize stratified samples of all interviews, the data gathered from Kayenta mineworkers will be of considerable value.

Control Areas: Tuba City-Red Lake

Tuba City is the largest administrative center on the reservation west of Fort Defiance and Shiprock. It is the headquarters of a Bureau of Indian Affairs (BIA) Sub-Agency and was, prior to the 1930s, an independent administrative unit known as the Western Navajo Reservation (Figure 5). The government compound, covering an area of one square mile, houses federal offices and employees. The facilities include a boarding school (grades 1 through 12), various administrative offices, a 75-bed IHS hospital and a field health operation, and a number of tribal and Office of Economic Opportunity (OEO) offices. Immediately north of the compound is a public school complex (grades 1 through 12) with housing for teachers. To the south of the compound, on either side of the road leading to the Kayenta-Shiprock highway are trading posts, gas stations, the Community Center, police station, tribal court, bank, post office, state employment offices, laundromat, stores, and cafes. Since the interviewing was conducted, a new 125-bed hospital has been completed and a new, combined public and federal high school has been opened. In 1970, the population was in the neighborhood of 3,400.

Tuba City has been a source of wagework for Navajos for 70 years. It should reflect an adjustment more urbanized in nature which has been made in the absence of economic activities of private industry. Similarly, Red Lake appears to be typical of a rural area affected only by steadily expanding federal programs and by an improving network of paved roads. The Red Lake population resides in an area 23 to 35 miles northwest of Tuba City. The paved road from Tuba City to Kayenta and Shiprock passes by the Red Lake Day School and near the Red Lake Trading Post. Prior to the completion of this road in 1961, Red Lake residents had a difficult time seeking wagework opportunities. Both populations were studied by Levy in 1960 and again by Levy and Kunitz in 1966. By restudying the same areas, some information about change with time was gained.

Tuba City

Tuba City was the only area of the present study where random sampling of the population was feasible (Figure 6). Fifty-eight interviews were completed in the area of greatest Navajo settlement just south of the government compound. The refusal rate was high (48 percent), and several attempts at sampling were made.

In 1960, a complete enumeration of all households was made by the IHS in the area known as South Tuba prior to the installation of a water and sewer system. From the total of 64 households, Levy drew a random sample of 21 households. In 1973,

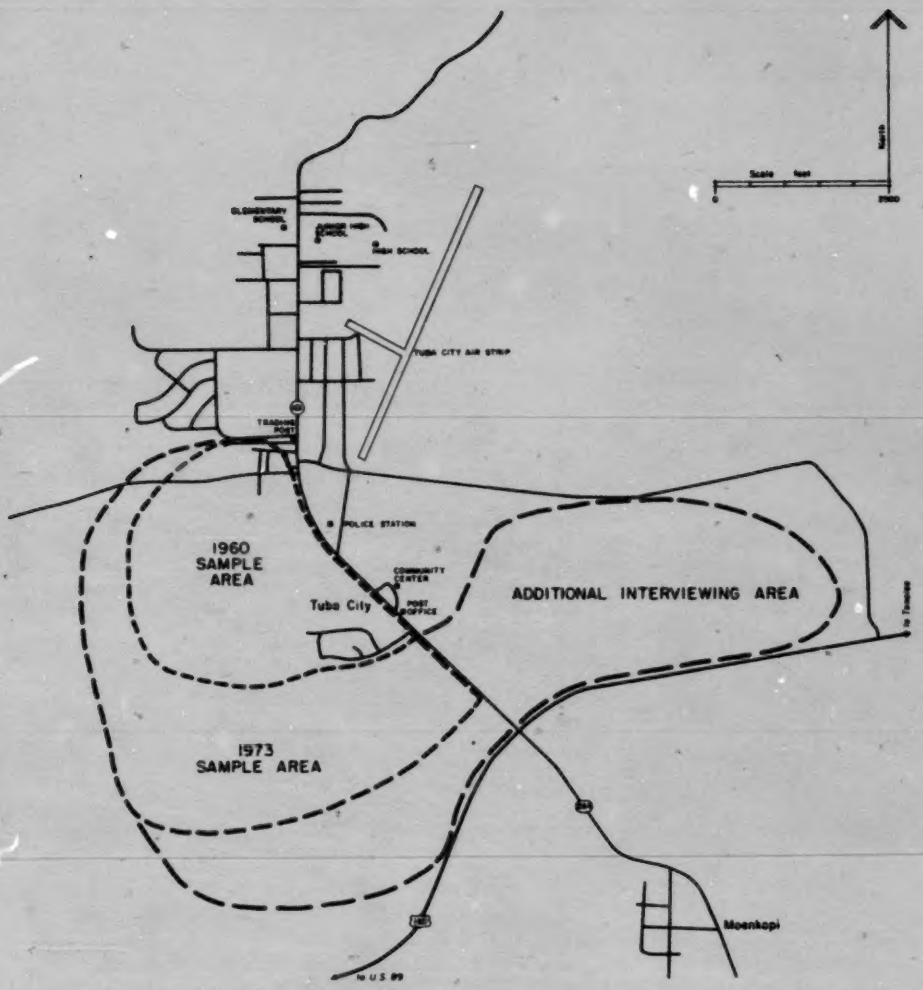

Figure 5: Control Area I: Tuba City

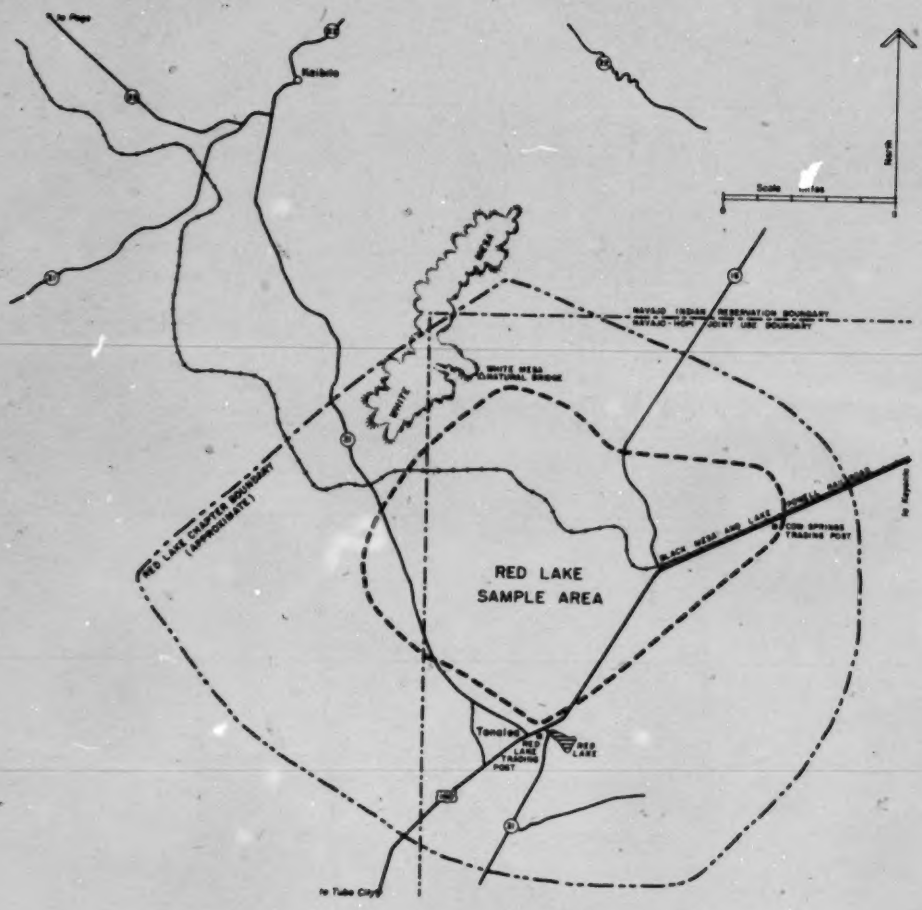

Figure 6: Control Area II: Red Lake

15 of these households were still in existence and available for interviews.

An enumeration of all dwellings south of the trading post and west of the paved road was made, and from the total of 268 houses, a random sample of 65 was drawn. Due to population growth, the area studied was somewhat larger than the original settlement. Thirty-one interviews were completed. In summary, 30 percent of all households were selected for interviewing by these two methods, the restudy and the new random sampling. Of these, all of the restudy households (15) and 32 households of the new random sample were interviewed. These interviews represent about 17 percent of the total population living in South Tuba.

The rapid growth of Tuba City over the ten years prior to this restudy has included an expansion of Navajo areas of settlement. Although this expansion has occurred to the north and west of the government compound, it is the area east of the Community Center that has become a settlement almost as densely populated as the old South Tuba area, which lies immediately to the west of the Community Center and police station. In an effort to obtain a more geographically representative sample, an additional 23 households in the new residential area were contacted. Of these, 11 were successfully interviewed. The refusal rate was about 50 percent.

There are two sources of bias in the Tuba City sample. The decision not to interview in the government compound led to the omission of some of the more educated and highly paid federal employees. This bias was accepted because we were primarily interested in the adaptation of the local Navajo to the relatively recent growth of federal and tribal programs. Local Navajo employees are, moreover, encouraged to obtain housing of their own. If more time had been available for field interviews, it would have been possible to study these career civil service employees in federal housing. Such a study would have provided valuable addition to our knowledge of the area.

The high refusal rate presents another problem. As far as the interviewer could determine, refusals came from families at all income levels. It is possible that there are important differences between those who refused and those who agreed to be interviewed, but we have no idea of what these differences would introduce.

Red Lake

In the rural area of Red Lake, 68 households were contacted and 60 interviews were completed. The refusal rate was only 12 percent. The sampling procedure paralleled that used in Tuba City.

In 1960 and again in 1966, Levy interviewed 19 related households thought to be typical of households in the area. In 1973 these households were recontacted. Death had caused the dissolution of three households, and divorce had led to the recombination of two households into a single unit. One family had left the reservation. In addition four new households had been formed. Seventeen of the identified 18 households agreed to be interviewed.

The sample was then enlarged by attempting to contact all families living in what was recognized by informants as a "land-use community." This community comprises an area of about 80 square miles. Within this area, the residents see

themselves as descendants of the original settlers of the area and, consequently, they identify and cooperate more readily with each other than with families in other communities. The boundary of the community in the view of most residents is a line running northwest from the Tonalea-Red Lake Day School to Wildcat Peak, then northeast along the base of White Mesa to where the mesa forms a corner at "Hole-in-the-Rock," from there southeast to Cow Springs Trading Post, and finally from Cow Springs Trading Post back to the school along Highway 160. In this larger area, 50 households were contacted and 43 of these were successfully interviewed.

The total area surveyed comprises about one-third of the entire Red Lake Chapter, which had a population of 2,050 in 1973. The mean household size in the area is 6.2 persons. According to these figures, the community would have approximately 100 households. The sample of 60 households thus represents about 60 percent of the target population.

Summary

Although each area sampled presented problems, we consider only two of the subsamples to be inadequate. These are the Lechee Grazing District subsample, because of the small number of households interviewed, and the Kayenta subsample, because of bias introduced in the sampling procedure. The Tuba City subsample is characterized by a high refusal rate (50 percent). Possible bias introduced by the refusals is, in our opinion, reduced by the large number of interviews administered, the geographically representative sample chosen, and the random sampling procedure used.

DEMOGRAPHY

The transition from a subsistence to a cash economy is generally thought to be accompanied by a number of demographic effects. Smaller families and more educated household heads would be expected in the wagework communities. The prevalence of the extended household should give way to that of the nuclear family. Wagework communities should include more immigrants from other areas than should rural communities. In this section a number of variables relating to the demographic characteristics of the populations studied are discussed. An important question considered throughout this section is whether the observed differences between wagework and rural areas are to be explained (1) by a transformation of the lifestyles of individuals within the affected area, or (2) by migration from rural to urban areas of younger, more educated males seeking employment.

Tables that accompany this section are found in the Appendix of this bulletin. The tables are organized as follows. In a given table, the most rural communities are grouped on the left while those closest to an urbanized settlement are listed on the right. Thus, data for Red Lake, Black Mesa, and the Lechee Grazing District are placed together. Red Lake is some distance from Tuba City and is little affected by the developments in the impact areas. Tuba City is classified as urban, but it is notably less reliant on wagework and has a lower average per capita income than either Black Mesa or the Grazing District, which are in the impact areas. The Route 89 population is also classified as urban and is geographically close to Page. The new jobs at the powerplant have resulted in a higher average per capita income for the Route 89 population. The Route 89 population more closely

resembles the Lechee Grazing District, however, in that both have an 86- to 87-percent reliance on wagework. Page, the Powerplant, and the Lechee Chapter populations are most alike in that they rely almost exclusively on wages.

Age of Household Heads and Spouses

The average age of male household heads is higher in the rural areas and in Tuba City than in the more urban wagework populations near the powerplant (Table 1). The average ages of the rural populations and of Tuba City are greater than 40 years, while those of all the other populations are less than 40.

Four samples have four or more female household heads. By our definition, a female is classed as a household head if, due to death, divorce, or separation, there is no male living in the household. It is therefore not surprising to find that in samples containing a number of female household heads, the average age of those females is higher than the average age of the male household heads in the same community.

Spouses of household heads tend to be younger than household heads in every sample except the Page and Powerplant samples, where the difference is negligible (Table 2). The youthfulness of married couples in the less rural areas was also found by Henderson and Levy (1975). They noted that when the age of the household heads is taken into account, the difference in family size between rural and urban families can be explained. The smaller size of families in urban areas is actually due to the younger age of the parents rather than to any fundamental differences between wageworkers and pastoralists. There exists the possibility that many demographic differences may be due not to lower fertility rates but to the position of younger wage-earning families in the childbearing cycle (cf. Kunitz 1976).

Education of Household Heads and Spouses

Tables 3 and 4 show the distribution of household heads and their spouses according to the number of years of education completed. The educational levels are categorized following the procedures of the 1970 U.S. Census of the Population.

In general, the average education of male household heads is greater in communities where the average age of household heads is low. As we have seen, this is characteristic of the more wage-dependent samples. The communities with the highest proportion of household heads with no education are the rural samples. It is quite likely that younger, more educated couples migrate from the rural areas to areas offering job opportunities. The rural areas become residual, that is, they retain the aged, the least educated, and those without job skills in general.

In the Tuba City and the Route 89 samples about one-fourth of the male household heads had no education, yet in the Tuba City sample, over one-third were high school graduates. Tuba City therefore shows a unique, bimodal distribution.

Red Lake, Black Mesa, Lechee Grazing District, Tuba City, and Route 89 have educational profiles very much like those reported by the 1970 census for all Navajos and for the Navajo Reservation. The median value for years of education for all Navajo adults was 5.3, while that for adults living on the reservation was 4.1

(U.S. Bureau of the Census 1973:Table 11). In the Page, Kayenta, Lechee Chapter, and Powerplant samples, educational levels are markedly higher than among Navajos generally. Much of this difference may be due to general advances in education rather than to specific conditions in wagework areas. The 1970 census shows that most Navajos between 25 and 35 years of age have had 8 or more years of formal schooling.

Marriage Patterns

In all sample areas most household heads were married (Table 5). Only four male household heads were divorced, widowed, or separated. Female heads of households were, by our definition, widowed, divorced, or single. Single heads of households were found only in the Powerplant, Page, Lechee Chapter, and Route 89 samples. Among these were three young unmarried women in the Page and Route 89 samples. It appears that the boomtown environment around the Navajo Generating Station allows young singles to live independently. Nevertheless, most of the young single males indicated in interviews that they often returned to their parents' homes to help out on weekends.

Tables 6 and 7 present the number of marriages of household heads and their spouses. Even after controlling for age, the proportion of household heads reporting two or more marriages is higher in the rural samples of Red Lake, Black Mesa, the Grazing District, and Route 89, where between 25 and 50 percent of the married heads of households reported two or more marriages.

The frequency of divorce was noted by Leighton and Kluckhohn (1946:83). They estimated that approximately 75 percent of all males and 66 percent of all females would marry more than once during their lifetimes. Our rural samples may represent a similar situation. It is our impression, however, that divorce is growing less frequent as men become more involved in wagework.

The highest proportion of households reporting marriages with non-Navajos are found in Page (27 percent), Lechee Chapter (19 percent), Tuba City (12 percent), and Black Mesa (11 percent). All but Black Mesa are urbanized wagework communities where a more heterogeneous population would be expected. Black Mesa is close to the Hopi Reservation, but further data analysis is necessary before it can be concluded that outmarriage in this area is predominantly with Hopis (Table 8).

Religious Affiliation

Table 9 shows the religious preference of male household heads and the senior adult females (spouses and female household heads). Frequently informants reported that they were affiliated with two or even three religions.

In the rural areas, religious preferences of males and females are similar, and it is in these areas that Navajo traditional religion and the Native American Church (peyote) have the greatest proportion of adherents. By contrast, the Lechee Chapter, Route 89, Page, and the Powerplant samples show the highest proportions of Christians. Generally, more women than men are Christian. These findings conform to our expectations and to the observations of others that Indian women tend to convert to Christianity more readily than do men.

The data for Kayenta are puzzling, perhaps because the sample was not representative. Here 56 percent of the women are Christian while 71 percent of the men have remained in the Indian religions.

Household Size

There is a general expectation that household size decreases as involvement in wagework increases. Despite the great reliance on wage jobs in most samples, only the Page and the Powerplant groups show small average household sizes, 4.1 and 3.9 respectively (Table 10). Red Lake, Black Mesa, Tuba City, Lechee Chapter, and Route 89 all average about six individuals per household. When it is recalled that the Page and Powerplant samples have the youngest household heads, it becomes apparent that these differences in household size may be largely a consequence of the corresponding differences between the average ages of household heads. Should further analysis determine that education and wagework do not effect a change in family size, some important implications for future planning must be considered, as heretofore the assumption has been that birth rates decline as a population develops economically.

Households in all areas send some of their children to federal boarding schools. Factors which may decrease the total proportion of households sending children away to boarding schools in the Page, Powerplant, and Kayenta samples are (1) smaller numbers of school-age children in these more youthful households; (2) greater proximity to day schools; and (3) less financial need to have the federal government feed and clothe their children for nine months of the year.

All areas sampled had average household sizes exceeding the national average of 3.1 in 1972 and the Arizona average of 3.2 in 1970. In fact, with the exception of the Page and the Powerplant groups, all samples exceeded the average household size for all reservation Navajo, which was 5.1 in 1970 (U.S. Bureau of the Census 1973:Table 15).

Some households in each sample housed temporary residents (transients), mostly relatives, who lived elsewhere most of the year. These individuals have not been included in the estimations of household size.

It should be recalled that in the Powerplant sample 45 percent of those interviewed were heads of households who had left their families at home in many different areas of the reservation.

Household Composition

The prevalence of large households in an area can be due either to parent couples in residential units having a higher than average number of children or to households consisting of multiple families. As Table 11 clearly shows, the single family unit is the major household type found in our survey. The single family unit comprises more than 60 percent of the households in all samples.

Multiple family households are found most frequently in the Route 89 (35 percent) and Lechee Chapter (25 percent) samples. Household compositions that we designate as "other" combinations are found in Tuba City (21 percent) and Red Lake (12 percent). "Other" combinations are defined as households that include other non-related individuals or families. The proportions of single individual households in the

Page and Powerplant samples are 21 percent and 19 percent, respectively.

It is clear that the average family size is somewhat smaller than the average household size suggests. No inferences as to fertility or birth rates should be made from residential unit size. While it is clear that single individuals can live alone in the Burtco dormitory and in Page motels, it is not apparent why multiple family households should be prevalent in Lechee Chapter and Route 89 while "other" combinations are characteristic of Tuba City.

According to the traditional, rural pattern, related nuclear family households reside in close proximity, forming extended families, or what we call "camps." In the Lechee Chapter and Route 89 settlements, however, there are numerous multiple family households. Lack of space and insufficient new housing are possible factors contributing to the prevalence of multiple family households. The Chapter and Route 89 settlements are so new that construction of new housing has not kept pace with demand. In any event, the frequency of multiple family and "other" combination households in all areas except the Page, Kayenta, and Powerplant samples indicates that the need for cooperating units larger than the nuclear family persists in most areas regardless of the degree of reliance on wagework.

Length of Residence in Sample Area

Table 12 shows unequivocally that the Navajo populations in the vicinity of the Navajo Generating Station are composed either of newcomers or of transients who return to their families in other areas on weekends. Even the Lechee Grazing District contains households that have immigrated for the express purpose of taking jobs.

The population of Tuba City has steadily increased over a long period of time. By contrast, the Lechee Chapter and Route 89 settlements have grown much more rapidly in a shorter period of time. Neither of these settlements existed prior to the construction of the Glen Canyon Dam. Households in the Lechee Chapter and Route 89 samples were coded as indigenous if either the household head or his spouse had been born or raised in the Lechee Grazing District within which the settlements are located. In the other samples, households were coded as indigenous only if the household head or his spouse were born in the community in which he or she presently resided.

Location of Prior Residence of Households

Table 13 shows households listed according to the areas (land management districts) in which they resided immediately prior to migrating into a sample area. Families who may have spent some time away from home are still coded as indigenous if they were living in their community of origin at the time of the interview. Transients living in motels or in the dormitory were coded according to their more permanent areas of residence away from the sample area.

The rural areas have experienced little immigration. Between 88 and 86 percent of all households in Red Lake and Black Mesa are indigenous. All migrants in the Red Lake sample came from adjacent communities. In the Black Mesa sample, only one of five migrants came from a community at some distance from Black Mesa. The prior residence of this one migrant, however, was in Land Management

District 8 adjacent to Black Mesa. In the Lechee Grazing District, two of the three immigrant households came from distant areas.

In Kayenta and Tuba City, a similar pattern exists, although Tuba City has a higher proportion of immigrating households. In these two areas, 87 percent of all households are either indigenous or are from adjacent communities. Seventy-five percent of all Route 89 households are either indigenous or from neighboring communities in Land Management Districts 1 and 3.

Not unexpectedly, the Chapter House, Page, and Powerplant populations are heterogeneous. Twenty-six percent of all Lechee Chapter households are from off-reservation areas. In Page over 50 percent of all households are from off-reservation areas, and only 18 percent come from neighboring communities or are indigenous (3 percent). Many Page households who had lived in other reservation areas before taking jobs at the Navajo Generating Station had also resided for varying periods in off-reservation cities. Before taking jobs at the Navajo Generating Station, about 45 percent of all household heads in the Powerplant sample had lived in off-reservation cities or in large on-reservation administrative centers such as Shiprock and Fort Defiance.

Unlike the Black Mesa strip-mining operation that has provided jobs for local populations, the Navajo Generating Station has attracted many more skilled and better educated families from the eastern half of the reservation and from off the reservation.

SOCIAL ORGANIZATION

In this section we are concerned with the expected transition from the traditional Navajo kin-based society, characterized by reciprocal kinship obligations and the extended family, to a society chiefly composed of independent nuclear families. To analyze this transition, we have chosen variables that measure those features that are thought to be characteristic of traditional Navajo society. In addition to evaluating the prevalence of the extended family and the frequency of cooperative activities, we have considered some variables that we hope will indicate the extent to which extended families are organized matrilineally and the extent to which cooperation is with the matrilineal kinsmen of the spouse of the household head. Such indicators at best are crude measures of the transition, however, and further analysis will be required before definitive statements can be made about the extent to which the transition has occurred.

Camp Size

The Navajo camp has been defined as a multihousehold residence group whose households are situated within shouting distance of each other and whose members cooperate in most subsistence and domestic activities (Collier 1951:24; Levy 1962: 782). In the present study, a single household residence group is called a single household camp. A household is comprised of all individuals living together in one dwelling. Thus, single households composed of joint or extended families are classed in our tables as single household camps. Arbitrary coding decisions had to

be made in very few instances. For example, two nuclear families living in a frame house that had been partitioned into two parts, each with its own cooking area, were classed as two households.

Our expectation was that the proportion of multiple household camps would be greater in the rural samples. This proved to be true (Table 14). We omit from consideration the Lechee Grazing District, where a small sample was taken; Kayenta, where an anomalous sampling procedure was used; and the Powerplant sample, which contains a large proportion of transients away from home. When the remaining samples are listed in order from the most rural to the most urban, we find that the proportion of single household camps increases continuously from the most rural to the most urban samples: Black Mesa, 36 percent; Red Lake, 61 percent; Route 89, 64 percent; Tuba City, 67 percent; Lechee Chapter, 86 percent; Page, 100 percent.

Quite unexpectedly, however, the highest average number of households per camp was found in the Route 89 sample as well as in the Black Mesa sample (1.9) and the second highest number was found in the Tuba City and Red Lake samples (1.5). We would have expected that the highest number would have been found at Black Mesa and in Red Lake. The Route 89 sample also has the highest proportion (35 percent) of multiple family households, although this area is intermediate between rural and urban. It is clear that in some wagework situations, factors other than pastoralism serve to maintain residential units larger than the single household nuclear family. These factors cannot be identified until multivariate analyses are made.

A large difference was observed in the proportions of single household camps found in the Black Mesa (36 percent) and Red Lake (61 percent) samples. It may be that the Red Lake population is more involved in wagework than is that of Black Mesa, despite the new strip-mine operations in the latter locality. Alternatively, the differences may have been characteristic of the two areas for a long period of time prior to the mining operations. Until more refined analysis of the data can be accomplished, we can only caution the reader not to assume that all rural Navajo communities are very much alike.

Camp Composition

The Navajo are frequently described as having typically lived in multiple household camps composed of a parent couple and their married daughters, their sons-in-law, and young grandchildren. This arrangement is called the matrilocal camp and results from a matrilocal post-nuptial residence rule, according to which after marriage the couple resides with the parents of the bride. The decline of Navajo agriculture and pastoralism and the increased reliance on wagework is assumed to increase the proportion of single household camps and to lower the proportion of matrilocal, multihousehold camps.

Establishing a traditional baseline against which to measure change is not a simple task. As long ago as 1936, approximately 53 percent of all family units on the Navajo Reservation were independent single household families. In Land Management District 2, an isolated area of the Western Navajo Reservation, 49 percent of all families lived in single household units. Within District 17, in the more populous southern Navajo area, 55 percent of all families lived in single households (Henderson and Levy 1975:138-139).

Black Mesa is the only sample of the present study in which less than 50 percent of all households are classed as single household camps. Urbanized settlements and those near the Navajo Generating Station have the highest proportions of independent single household camps. Moreover, the matrilocal camp is more common than any other type of multihousehold camp (Table 15). Black Mesa and Route 89 report the highest proportions of matrilocality, 24 and 21 percent respectively.

Trends do not emerge clearly even in areas where we have data from adequate samples studied in earlier years. In 1960, 42 percent of South Tuba was composed of single household camps. This proportion had grown to 61 percent by 1973. In Ramah, however, neolocal residence declined from 84 percent in 1950 to 46 percent in 1964, while the proportion of matrilocal camps increased from 6 to 23 percent during the same period (Henderson and Levy 1975: 138-139).

Clearly, factors other than reliance on wagework versus traditional economic pursuits are influencing camp size and composition. It is probable that migration explains the high proportions of single household camps in the Powerplant, Page, and Lechee Chapter samples. Those Navajos who must migrate great distances in order to get jobs become separated from the more traditional kinship networks.

Community of Residence after Marriage

Kluckhohn and Leighton (1946:55) and Collier (1951:8) have asserted that matrilocal residence was more uniformly prevalent among the Navajo living in areas producing livestock than it was in farming areas. It is not clear whether this pattern was controlled by economic reasons or whether it was due to the more isolated and traditional nature of the predominantly pastoral western Navajo Reservation. If economic factors were the cause, we would expect our rural samples to show a high proportion of matrilocal post-nuptial residence. If the pastoral pattern were the control, we would expect, in addition, that the wagework samples would show lower proportions of matrilocal residence.

Table 16 shows the community of origin of male household heads and their spouses. Matrilocal residence after marriage is not measured directly by this variable. When a woman from another community marries into a new community, the residence pattern almost certainly is not matrilocal. In the great majority of cases we observed, the woman remained in her home community. What the post-marital residence was in actuality we do not know, but we infer that by staying in her home community, the woman's grazing rights would not be jeopardized.

Although the proportion of women marrying into the community of the spouse is less than 31 percent in all samples, the rural areas do not show the smallest proportions of such women. This result was contrary to our expectation. The Tuba City, Kayenta, and Route 89 samples, none of which are the most rural of our study, showed only 5 to 14 percent of all women marrying into the community of the spouse. The proportions in the rest of the samples ranged from 23 to 30 percent. Red Lake (our rural control sample) and the Powerplant samples had the largest proportion, 30 percent.

Livestock Ownership and Patterns of Cooperation Beyond the Camp

In previous sections we have shown that while multihousehold camps predominate in rural, pastoral areas, the highest values for the average number of households per camp were found in both rural (Black Mesa and Red Lake) and urban or impact samples (Route 89 and Tuba City). We also found that although single households were most often comprised of nuclear families, the highest proportion of multiple family and "other" forms of households were found in the Route 89, Lechee Chapter, and Tuba City samples.

It is generally assumed that extended families provide a larger labor pool that facilitates survival in a subsistence-based economy (Kluckhohn and Leighton 1946:57). Thus, the more traditional Navajo pastoral economy should be associated with higher proportions of extended families. Our findings suggest that there is also some need for large multiple and extended households in the wagework economy. Jorgensen (1971:110) has proposed that where the sources of wagework are not stable and where the income is low, the family cannot afford to sever cooperative ties with kinsmen. In instances where migration has made this traditional form of cooperation impossible, new patterns of cooperation and residence will be formed with non-kin. Without multivariate analysis, we cannot say with certainty why the large households persist in the wagework areas. It is possible at this stage, however, to examine some variables that measure the extent and nature of cooperation beyond the camp level.

The multihousehold camp should be able to fulfill most of its daily domestic and subsistence activities. These include hauling wood and water and herding sheep and cattle for grazing purposes. Cooperation beyond the camp level should be present in samples with a high proportion of single household camps lacking modern utilities. Inter-camp cooperation for such large-scale activities as sheep shearing and lambing would be expected in those pastoral areas with the largest flocks. Households moving into an area seeking wagework, but wishing to retain their grazing rights, would tend to leave their flocks at home with relatives.

In Tuba City and in the impact areas around the Navajo Generating Station, reliance upon others to assist in hauling wood and water should involve more frequent cooperation with non-kin than in the other samples. We would expect cooperation with the wife's kin to be more prevalent in rural than in urban areas. We would also expect that in all areas where sheep are pooled with persons outside the camp, sheepherding tasks would be pooled more with the wife's relatives than with the husband's relatives or with non-kin.

Hauling Wood and Water

Utilities are available to most families in the Page, Powerplant, Kayenta, and Tuba City populations. Only households lacking running water, gas, or electricity have been included in Table 17, which shows who helps to haul wood and water.

The general pattern is that camps provide for themselves without recourse to outsiders. Tuba City, where only 40 percent of all camps haul their own fuel and water, is the major exception to this rule. Red Lake has the second lowest proportion of camps that do their own hauling. The high proportion of divorced and separated female household heads in Tuba City may

help explain this result. It is not known why the proportion at Red Lake is so low.

When wood and water are hauled by persons outside the camp, it is done mostly by relatives in Black Mesa; mostly by non-relatives in Tuba City; and about equally by relatives and non-relatives in Red Lake and Kayenta. In the other samples, the numbers of camps hauling their own wood and water are too small to be considered in this analysis.

Tuba City and Kayenta, with their easy access to running water and electricity, conform to our expectations that less hauling of wood and water will occur in these areas. At Black Mesa, on the other hand, we find a higher incidence of cooperation because of the great distances that must be traveled to obtain wood and water. The situation at Red Lake is not immediately explicable. It is likely that higher incomes and greater numbers of cars in the samples near the Navajo Generating Station permit even single household camps to perform their own hauling.

Cooperative Arrangements for Herding Sheep

The percentage of households owning livestock is higher in the rural samples than in those we have called urban. The proportion of households pooling their flocks with others outside the camp is highest in the urban areas and lowest in the three rural samples: Black Mesa, Red Lake, and the Lechee Grazing District (Table 18). Size of the flocks does not influence whether the sheep are pooled or not. It appears that few camps have needed help during shearing and lambing operations since livestock reduction in the 1930s. The camps in the more urban samples must leave their sheep with others while they take jobs at the powerplant or live in a settlement like Tuba City. It is not clear why more camps in the Red Lake sample pool their flocks than in Black Mesa and Lechee Grazing District.

When pooling of flocks does take place, in most samples the sheep are generally merged with those of the wife's relatives. In the Powerplant sample the husband's family more commonly assumes this task. In the Page, Lechee Chapter, and Tuba City populations, the preference is less clear. In none of the samples do households pool livestock with non-relatives for any purpose.

It is clear that the pooling of stock is a family affair that, among other things, allows members of the household to leave the home area to take wage jobs. Moreover, the matrilineal relatives of the wife most often assume this function, although patrilineal relatives and non-kin as well may assume it in the more urban samples.

Stock Permits

Data relating to the ownership and inheritance of stock permits are unreliable for all samples except Black Mesa and Red Lake. Ownership of stock permits in the Black Mesa sample differs considerably from that in Red Lake. On Black Mesa, more male household heads own permits than in Red Lake. The reason for this is not clear. The greater ownership of permits may be a function of the large involvement with stockraising and the large proportion of multiple household camps at Black Mesa. Black Mesa has the highest proportion of matrilocal and patrilocal camps.

In the Red Lake sample we were able to document a few cases in which permits were inherited. In each case, inheritance passed from a parent of either sex to all

children, more or less regardless of sex. We had expected to find a matrilineal inheritance pattern. The number of cases, however, was too small to make any definitive conclusions as to the general pattern of such inheritance.

ECONOMICS

Economic variables are considered in terms of income, major expenses, and commercial transactions.

Our expectation is that the areas affected by rapid economic development will have higher incomes, greater involvement with wagework, less unemployment, less reliance on welfare, and minimal reliance on livestock as a source of income. Larger cash earnings should enable families in the impact areas to purchase and sell items for cash at stores in a number of locations rather than relying on credit extended by the local trader.

Unlike off-reservation migrants, the on-reservation workers have minimal housing costs, free medical care, and the option to send their children to federal boarding schools for nine months of each year. Offsetting these advantages for on-reservation workers, however, are their larger family sizes and the difficulties of commuting long distances to work. Per capita income is often a more accurate gauge of economic standing than is the annual income for each household. Because of long commuting distances and the need to haul wood and water, the annual outlay for automobiles must be examined in some detail.

Income

Table 19 is a summary of average per capita incomes by source and the proportion of the total income in each sample derived from each source. It is clear that the control samples have the lowest incomes and that the two rural samples (Black Mesa and Lechee Grazing District) also have low incomes. All these samples are also the least involved in wagework and the most dependent on welfare. Pastoral pursuits in no way compensate for the lack of wage income in the rural areas. On the whole, our expectations seem to be fulfilled. We do not know, however, whether the members of families with higher incomes within a sample are obtaining jobs at the powerplant or whether the members of families with high unemployment are obtaining these jobs.

Wage Income

Table 20 compares the wage incomes in all samples for families with jobs. Not only are the control samples less involved in wagework, but also the wageworkers themselves receive less income than those in the impact areas. Virtually none of the wageworkers in the control samples have power-related jobs. Furthermore, it is likely that salaries for power-related jobs are higher on the average than are salaries for other jobs available in the control areas. It is also probable, in the light of the differences among samples in age and education of heads of households, that wage earners in the more rural impact areas are less skilled and therefore less well employed than those of the Page, Powerplant, and the Chapter populations in the more urbanized areas.

Tables 21 and 22 show the employment status of heads of households at the time of interview. The highest unemployment rates of male household heads are found in Tuba City (38 percent) and Red Lake (48 percent). Interestingly, the Chapter and

Route 89 samples have unemployment rates higher than 20 percent. Female household heads have, as a rule, high rates of unemployment, especially in Tuba City, Black Mesa, and Red Lake. Female heads of households are generally the older, widowed, and divorced women of these communities.

Table 23 shows employment status of spouses of household heads. Wives, as a rule, are unemployed.

It is not possible to say what the unemployment rate in the study communities would be if all those seeking work were to be enumerated. But when one considers that the unemployment rate for males with families to support is as high as 48 percent in the rural control sample, a total rate of at least 60 percent would not be unreasonable for all those under retirement age who would take work if it were available. The amount of underemployment is also considerable, as the low per capita income from stockraising suggests. The number of retired male household heads is virtually zero in the areas around the powerplant, indicating, as we have already seen, that the populations near the powerplant are composed primarily of immigrants.

Tables 24 and 25 show the type of employer (for the most recent job held) of all household heads and their spouses. Self-employment (stockraising) is, of course, important in the rural areas. Federal and tribal governments are major employers in Tuba City, Red Lake, and the Grazing District. As was anticipated, the power industry is the major employer in all impact areas except the Lechee Grazing District. In the samples near the town of Page, private business provides jobs for spouses as service workers.

It is not surprising to find that the vast majority of household heads are employed as laborers and protective service workers. The chronically unemployed are found in the control and rural samples. The disabled are found only in the control samples (Table 26). In the clerical and farmer occupational categories, the upper levels (as established by the Bureau of Labor Statistics) are rarely attained by Navajos in our samples, and only the lowest level of the professional occupational category is attained. Migrant laborers are only found in the control samples and the Lechee Grazing District. Both the Chapter House and Route 89 populations are well represented in the heavy labor category. From the numbers of workers involved in heavy labor, we infer that these two populations have lower skill levels compared to the Page and the Powerplant samples. The lower wage incomes of the Route 89, Grazing District, and Chapter House samples have already been mentioned.

Table 27 shows the occupations of spouses. Most spouses are housewives, although wives in the Route 89, Chapter House, Page, and the Powerplant samples commonly are employed. Employed spouses in the rural areas are almost always engaged in stockraising while those in Tuba City are protective and service workers (e.g., BIA dormitory personnel). This pattern is also found in the Page, Powerplant, Route 89, and Chapter House samples in which workers in this class are usually employed, for example, as waitresses and motel maids. Very few professionals (school teachers) are present in the Page

and Powerplant samples. Not only are household heads better employed in the areas around the Navajo Generating Station, but also the town of Page offers more job opportunities for spouses.

Table 28 shows the location of the jobs held by heads of households. Most samples report that the majority of jobs are in the family's area of residence. The Grazing District, Black Mesa, Tuba City, and Kayenta families tend to be indigenous. Most Chapter House and Route 89 families have made short moves from the surrounding Grazing District to the new settlements. The exceptions to these patterns are found in the Powerplant, Page, and Red Lake populations. Ninety percent of the Powerplant sample and 45 percent of the Page sample have moved into the area from some distance away. In Red Lake, where few jobs are available locally, 47 percent of all household heads must commute some distance to work.

The highest monthly wages are paid by the power industry to household heads in the Page, Powerplant, Route 89, and Chapter House samples (Table 29).

During the two-year period immediately prior to the interviews, only household heads in the Page and Powerplant samples had nearly achieved full employment. Compared to husbands, wives in all samples make a smaller contribution to the total household income, but this contribution is nonetheless quite significant (Table 30). The few unmarried children in these households who are gainfully employed make a comparable contribution.

Other employed individuals, generally teenage children, have earned less and have been paid at lower rates than have their fathers (Table 31).

Unearned Income

All samples report households receiving some form of unearned income, although the Page and Powerplant groups are far less reliant upon this form of support than are the other samples. Unearned income is, moreover, a significant source of income for most of the households receiving it. Only in Page is the average annual unearned income less than $1,000. In the control samples, by contrast, the average is in excess of $2,000 (Table 32).

The control samples, Red Lake and Tuba City, and the rural samples, Black Mesa and the Grazing District, are the most heavily reliant on welfare income from such sources as Aid to Dependent Children, Emergency Tribal Welfare, General Assistance, and Unemployment Compensation. The Powerplant and Page samples receive more from sources that are not indicators of economic distress, such as tribal scholarships, job benefits, and veterans benefits. The portion of the population that is retired in Tuba City accounts for the large social security and pension payments in that sample.

Patterns in the Lechee Chapter House and Route 89 populations are intermediate to the patterns displayed in the samples mentioned above. The Grazing District and Kayenta samples are too small to be analysed for patterns of unearned income.

While the expected lessening of reliance on welfare in areas impacted by power development is found in the impact area around Page, we have not determined whether the welfare families in the indigenous population obtain jobs when they are made available.

Livestock Income

In no sample did the annual per capita income from livestock operations exceed $80 (Table 19). The mean annual dollar return to households selling sheep does not exceed $200 (Table 33; Tuba City had only one household selling sheep and is, therefore, not considered). An average of between $200 and $300 annually was realized from wool sales in Red Lake, Kayenta, Lechee Grazing District, and Tuba City (Table 33). Considerably more income was earned from cattle sales, although very few households are engaged in cattle raising (Table 34). Household ownership of horses is shown in Table 35.

The mean annual dollar return to households selling livestock and livestock products of all types is about $500 for most samples (Table 34). The dollar value of stock consumed ranges from $106 in Tuba City to $1,225 in Kayenta (Table 36).

Some conclusions can be drawn concerning livestock operations as a source of income. The first is that pastoralism is not a viable alternative to wagework in any of the areas studied. In the aggregate, unearned income is more important for an unemployed family than is income from all livestock operations. No households in the survey were able to rely entirely on livestock. The two family heads in Tuba City with high returns from cattle sales were also full-time wage earners who spent large sums for cattle feed. Their stockraising supplied only supplementary income.

The second conclusion is that home consumption of livestock is an important contribution to the diet of rural area families that are most reliant on livestock and that have the least amount of cash available. The market value of the meat consumed is considerably more than the sale value that we used to compute the income equivalent of the meat consumed.

Finally, we observe that there is no single pastoral pattern; instead, we find a variety of practices. Wage-earning households in the impact areas and in Tuba City tend to raise cattle that demand less care and have a higher sale value. These families also have the cash to purchase feed. Black Mesa has the highest proportion of households owning cattle, while Red Lake has a lower proportion than we would expect in a rural area. We suspect that the difference between the two areas is related to the introduction of jobs at the strip mine on the Black Mesa. In contrast, Red Lake has the highest average return from wool sales, while Black Mesa has among the lowest.

In general, our expectations as to the patterns in degree of involvement in livestock activities in the samples have been confirmed. The rural areas rely more on livestock than do the more urbanized areas. Livestock is used more for sale by wage-earning groups and more for home consumption by the rural groups. The deviations from this pattern that are not explained by sample size must be investigated further.

An unexpected finding is the degree to which families in Page, the Powerplant, and the transitional Route 89 and Chapter House communities are still involved in stockraising. In Page, for example, 73 percent of all households owned livestock, 52 percent owned horses (Table 35), 42 percent owned cattle, and 40 percent owned sheep. Though the average

dollar amount received from all livestock activities is the lowest in this sample, the continued interest in stock ownership deserves investigation.

One possible explanation is a cultural one. Navajos are attached to their sheep by reason of sentiment. Another explanation is economic. In a job-scarce environment, employed Navajos retain their livestock as a hedge against unemployment. We suspect the latter explanation has greater validity. Wage earners in the Page and Powerplant communities will not relinquish their stock permits as long as they live in a boom-and-bust economy. Subsequent multivariate analysis will enable us to determine which wageworkers retain their livestock and which forsake pastoral pursuits entirely. We expect that the more highly skilled and educated Navajos have less interest in livestock.

Agricultural Income

Commercial income from agriculture is virtually zero in our samples. The rugged terrain, poor water supply, and harsh climate of the western Navajo Reservation make farming a marginal activity at best. The rural populations generally report more households engaged in farming than do the wagework samples. There are also more sources of water available for farming in the Red Lake area than there are around Page (Table 36).

Thirty-three percent of all households in the Red Lake sample engaged in some farming, while only 22 percent in the Black Mesa sample reported some farming. None of the Lechee Grazing District households reported farming. We assume that the reason for this is their location in the most northerly part of the district.

Only 10 percent of Tuba City households farmed. Families with farms along Moenkopi Wash and at Moenave tend to live adjacent to their fields and so were not included in our sample.

In the Route 89 and Page samples 5 and 6 percent, respectively, of all households reported farming. These low percentages for these samples are understandable because of both their location (unfavorable for agriculture) and their involvement in wagework. Intermediate proportions were found in the Kayenta (17 percent), Powerplant (16 percent), and Chapter House (14 percent) samples. It is not known why these samples report more farming than do the Tuba City and Route 89 samples.

Whether the home consumption of agricultural produce provides a significant nutritional supplement is a moot question. Both the success of and the investment of effort in agricultural enterprise in the study areas are very erratic. It is our impression that Navajo families find it easier to purchase food by cash than to grow their own. Since World War II, reasonably extensive irrigation systems in Navajo Canyon have been abandoned. Many farms in Cow Springs Canyon near Red Lake have been unused for 5 to 8 years.

Craft Income

Native arts and crafts are not a major source of income on the western Navajo Reservation (Table 19). Nevertheless, craft-producing households in a few samples do receive a helpful income supplement from this source. The western Navajo are in general not famous for fine jewelry or rugs. Notable exceptions include rugs woven in the Tuba City "Storm

Pattern." Also, weaving was revived on Coal Mine Mesa during the 1960s. Some women in the Gap-Cedar Ridge area have become well known for their pictorial rugs. Jewelry-making was so sporadic and of such small consequence in our sample area that dollar returns were not calculated separately in our analysis.

During recent years, the production of cheap jewelry made of safety pins, plastic beadwork, and seeds has been on the increase in the study areas. Sales are most frequently made from family-owned stands along the major highways. Income from this craft has been computed separately from income derived from the more traditional crafts, in this instance, weaving.

The Route 89 sample is exceptional in that it receives the most income of all samples both from weaving and from other crafts (Table 37). The mean dollar return per weaving household is $591, while that from other crafts is $827. Only Tuba City approaches this weaving income ($496) while the next largest incomes from other crafts are found in the Red Lake ($419) and Chapter House ($400) samples.

It is clear that the heavy tourist traffic along Highway 89 and through Page provides opportunities for the sale of both traditional and non-traditional crafts by households in this impact area.

Tuba City's high income from rug weaving is not matched by sales from other crafts. The retail outlets on the highway from Tuba City to Kayenta do not sell this type of product, but there is a reasonably good market for rugs woven in the Tuba City style. Red Lake households have set up little stands to sell their trinket jewelry on the Kayenta highway at Elephant's Feet, a popular resting stop with no retail outlets.

Major Expenses: The Cost of Owning a Vehicle

For the vast majority of Navajos, owning an automobile is a necessity despite the large expenses involved. The western Navajo Reservation has few paved roads, and most families must travel long distances to work, to market, and to services. Hauling wood, water, stock feed, wool, and livestock all require driving many miles. As public transportation is entirely lacking, each family must have access to a car, truck, or wagon. Red Lake and Black Mesa are the most rural and the least well employed populations studied. Consequently, the costs of owning and maintaining a vehicle consume proportionately more of the income dollars in these areas.

The areas with the lowest incomes have the largest proportions of households without vehicles: Red Lake, 40 percent; Tuba City, 40 percent; Black Mesa, 33 percent. Most families own only one vehicle but, not surprisingly, the Chapter House, Powerplant, and Page samples have higher proportions of households owning second vehicles (Table 38). The family without a vehicle must rely on relatives or friends for transportation. In the Red Lake area, another household in the same camp commonly provides routine transportation for a household without a vehicle. Navajos pay for rides provided by anyone, even a relative, from outside their home camp.

The pickup truck is the most functional vehicle in the terrain of the study area. It is therefore not surprising

to find that most families in all samples own one. Sedans are the most common second vehicles in Tuba City and in all impact area samples with the exception of the Grazing District (Table 39).

In the impact areas, most vehicles are insured. In Red Lake and Tuba City, however, over 30 percent of all first vehicles are uninsured (Table 40). Insurance is most often obtained through a dealer rather than purchased from a bank or independently negotiated with an insurance company. It was our impression that the insurance rates charged Navajos were high and that the coverage provided was less than comprehensive.

Many owners drove from 30,000 to 50,000 miles each year. An annual average of 25,000 miles for vehicle owners in rural samples is a conservative estimate. Gasoline prices are high on the reservation and are only slightly less in neighboring off-reservation towns. An average of $0.40 per gallon is a conservative estimate of the 1973 gasoline prices in the area. Monthly payments on car loans, including insurance, averaged $107 in Red Lake and $120 in Black Mesa (Table 41).

Considering only the car payments and the cost of gasoline for a pickup truck averaging 12 miles per gallon, we find that the annual cost of owning a truck in Red Lake is $2,117 and in Black Mesa is $2,273. This is a conservative estimate indeed, because the cost of maintenance and the prorated cost of the down payment have not been included. Nevertheless, by these calculations, the hypothetical average family in Red Lake would spend about 47 percent of its income on transportation, while its counterpart on Black Mesa would spend 39 percent.

These averages are certainly higher than those for families elsewhere in the western U.S., and they must counterbalance the benefits for Navajos accrued from free medical care and low housing costs. If we take into account the fact that many Navajo families do not own cars, we conclude that the hypothetical average family is not necessarily a car-owning one. Nevertheless, even if we consider only those households with wage income, we find the cost of owning a car amounts to 54 percent of the average household wage income for households with wage jobs in Red Lake. Interestingly, the cost of owning a car represents only 31 percent of the average wage income in Black Mesa. It appears that the cost of vehicle ownership is considerably less onerous in the impact areas.

Navajo purchases of new and used vehicles are made in off-reservation towns. One Ford dealer in Gallup, New Mexico, grosses more than $12 million annually. Approximately 80 percent of his sales are to Indians, most of whom are Navajo. Current prices for pickup trucks range from $4,800 to $7,000 (Sterba 1975:Section G, page 3). Not only are individual Navajos spending a very high proportion of their incomes on transportation, but also the Navajo economy receives little benefit from this spending, as the businesses making profits are all Anglo-owned and neither pay taxes to the Navajo Tribe nor spend these profits on the reservation (Gilbreath 1973). Navajo customers offer good business for off-reservation car dealers, dry

goods retailers, and liquor merchants. The dollar value of Navajo purchasing in the border towns contradicts the image of the Indian as a poor business risk.

Commercial Transactions

Virtually none of the businesses serving the western Navajo Reservation are owned by Navajos. Thus, the multiplier effect benefits non-Indian merchants. Salaries earned by Navajos on the reservation are mostly spent in off-reservation towns because there are so few retail establishments on the reservation. In the Black Mesa area, for instance, for each one business there are 1,600 people. In Kayenta the ratio is 1 business for every 250 people. Many of these businesses, however, cater to the tourist trade. Over 58 percent of all retail businesses on the reservation are general merchandise stores such as the trading posts. Navajos must purchase automobiles and appliances, for example, off the reservation (Gilbreath 1973:19-24).

At the present time, Navajos are concerned with ending the business monopoly of the trading posts, which is discussed below. They hope that improved road systems, increased numbers of vehicles, and cash wages will permit Navajo consumers to shop and sell selectively and thus will foster competition among businesses.

A few decades ago pastoral Navajos on the reservation exchanged raw materials (lambs and wool) and craft products for costly manufactured articles: "...they labored under the continual disadvantage of buying in a protected, and selling in an unprotected, market" (Kluckhohn and Leighton 1946:39). During a given year, Navajos bought goods on credit and paid for them later when the lamb and wool produce was sold. The successful trader was one who, knowing in advance exactly how much each family would realize from sales of native produce, would extend exactly that amount of credit. Kluckhohn and Leighton observed in the period immediately after World War II that "...some traders...have granted credit so liberally as to keep families in perpetual debt, have reduced them in fact to a state of peonage dependency" (Kluckhohn and Leighton 1946:39).

By 1955, the trading post was in a period of transition (Adams 1963:168). As wage income increased, livestock, craft sales, and pawn no longer formed the basis of the credit system. The new system is based upon credit extended against expected social security, retirement, and welfare checks (Federal Trade Commission 1973:8). Nevertheless the trading post remains a highly lucrative enterprise. According to the Federal Trade Commission, geographic isolation and abusive trade practices continue to keep Navajos dependent upon the trading post (Federal Trade Commission 1973:3). "In the typical trading post, credit sales account for up to 90 percent of gross sales" (Federal Trade Commission 1973:12).

Table 42 displays the proportions of all households selling or buying from only one store. Rural areas have larger proportions of households selling craft products, livestock, or wool: 78 to 94 percent as compared with 29 to 43 percent of households in the more urbanized samples. The Route 89 sample resembles the rural samples in this and in most of the following tables.

Rural households usually buy and sell at more than one store. As the

frequency of transactions has not been measured, however, we cannot conclude that the trading post monopoly has been broken. For example, a household selling all of its weaving, wool, and livestock to one trading post and selling some beadwork jewelry to tourists along Route 89 would have been classed as selling at more than one store.

Most rural households (70 to 80 percent) buy on credit while the more urban impact-area samples tend to pay cash for most routine purchases (Table 43). In addition, there is a tendency for households in the impact areas to have credit at several locations. In Page 42 percent and at the generating station 64 percent of all households with credit have accounts at more than one location. These samples and the Lechee Chapter are the only ones that report receiving credit in towns at some distance from the reservation. No household in the rural areas receives credit from any off-reservation establishment (Table 44).

In the Tuba City, Route 89, and rural samples, from 50 to 78 percent of all households obtain loans, while only 25 to 47 percent of the more urbanized impact area samples do so (Table 45). The striking exception to this pattern is Black Mesa, where only 27 percent of all households had obtained loans during the year preceding the interview. There is no immediate explanation for this low percentage. Since the Kayenta sample reported an equally low proportion, it is possible that the interviewer in this area did not obtain reliable responses to these questions.

Loans tend to be small, averaging from $73 to $272. The amount borrowed does not vary according to the urban or rural character of the samples (Table 46). Loans are made primarily to meet routine expenses, and only occasionally are made to finance automobile repairs or trips (Table 47). Only in the Powerplant, Page, and Lechee Chapter samples had more than 40 percent of borrowing households repaid loans made during the preceding year (Table 48).

Interest had to be paid on most loans. Only in the three most affluent samples (Page, Powerplant, and Lechee Chapter) did a third or more of the households negotitate interest-free loans from friends (Table 48).

Households in the rural samples obtained loans from local trading posts or trading posts and stores in Kayenta and Tuba City (Table 49). There was a stronger tendency for households in the Page, Powerplant, Route 89, and Lechee Chapter samples to negotiate loans in Page, other border towns, towns at some distance from the reservation, or from friends (Table 49).

The differences between the rural and more urban samples are reasonably clear. The rural households rely more on credit that is most often obtained from a local trading post. By contrast, households in the more urban settlements near the Navajo Generating Station rely less on credit and, when they do, it is often obtained from off-reservation establishments.

Tables 50 and 51 show that the number of locations where household purchases are made do not vary significantly from sample to sample. Page and Powerplant households often make food purchases in border towns other than Page.

Most households in Page, the Powerplant, and Lechee Chapter samples purchased clothing in border towns or in more distant cities such as Albuquerque and Phoenix.

It appears that wagework employment is the crucial factor that permits some Navajos to avoid the higher prices charged by the trading posts, to obtain credit from off-reservation establishments, and, in some cases, to avoid using credit almost entirely. The establishment of a credit rating has also been possible for some families who have obtained national credit cards (Table 43).

Paved roads, automobiles, welfare checks, and sporadic employment have not enabled the rural Navajos to decrease their dependence on the trading posts. According to the Federal Trade Commission, "trading post prices exceed the national average by 27 percent and the average for nearby 'off-reservation service centers' by 16.7 percent" (Federal Trade Commission 1973:17). The proportion of the already small income which is spent on higher prices and on interest charged on loans, not to mention the value of pawned items lost when a loan is not repaid, should be more accurately determined.

CONCLUSIONS

The populations sampled in the areas impacted by power development differed from those in the control areas as anticipated. The impact area populations have higher incomes, are better employed, are less reliant on welfare, and are better educated. They tend also to have smaller families and to be less involved in reciprocal relationships with kinsmen. The duration of the economic boom generated by the construction of the Navajo Generating Station and the Black Mesa coal mine has been too short to have had any appreciable affect on the goals, values, and lifestyles of the local populations. It is therefore unlikely that these populations have been greatly transformed by the power developments. Our data suggest that we are witnessing a geographic rearrangement of populations rather than the modernization of an indigenous one.

Household heads in the Page area samples are younger than those in the rural samples. This fact alone might explain the smaller family size and the higher levels of education found among the populations in the vicinity of Page and the Navajo Generating Station. These populations, moreover, have migrated into this area specifically for the purpose of taking jobs. It appears that better educated and more skilled Navajos are willing to leave their home communities in order to support themselves and their families. The result is that the rural areas are drained of young people. These areas have come to be inhabited by residual populations comprised of the least skilled, the older, and the more dependent Navajos. This interpretation is supported by the fact that according to most variables the Black Mesa sample resembles Red Lake more than the other impact area samples. In the Black Mesa region, jobs were made available in an area with a large population. Increased job opportunities have resulted only in a lower level of unemployment and slightly higher average annual incomes. A large proportion of households remains on welfare. Stockraising is still an important activity and the social organization appears to have changed little, if at all.

The very different population profiles found in communities in the Page impact area are directly attributable to the fact that these are new settlements made up largely of younger, more educated Navajos.

In time, sustained economic development might produce lasting social and economic changes on the reservation. Whether the expectations of the Navajo Tribe for such development will be realized is, however, a moot question. The rural pockets of Navajo poverty can only be changed by long periods of high employment. The present job boom has all the appearances of being temporary. When construction is completed at the Navajo Generating Station, employment levels will drop precipitously. The majority of the Navajo workers will have to move elsewhere in search of work. Large proportions of Navajos employed at the generating station still own livestock that they leave at home with relatives. The livestock may serve as a hedge against unemployment.

In our view, the major factor promoting the modernization of the Navajo population is federally funded education that affects communities throughout the reservation. The expectations of Navajo youth are rising and there is an increased political awareness that was not in evidence a few years ago. Soon after graduating, most of the better educated Navajos either leave the reservation to find work or take jobs in tribal or federal programs. While these governmental agencies are the largest employers on the reservation, they primarily provide jobs in service occupations (health, education, and welfare). Without economic development, the reservation runs the risk of becoming a large residual population supported by federal spending.

Utilizing Navajo natural resources to provide employment is only the first step toward creating a more productive economy. The survey data presented here show that the newly created jobs in the Lake Powell region attract a number of off-reservation Navajos back into the tribal economy. Nevertheless, as long as the rural areas are characterized by high birth rates and continued loss of the more educated young people, economic problems will persist. As long as Navajos spend their payroll dollars in non-Indian establishments, the multiplier effect will not benefit the Navajo economy.

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GLOSSARY

affine — relative by marriage

availability sample — a non-random sample consisting of all those people who are accessible to the investigator and who are willing to be studied

BIA — Bureau of Indian Affairs

camp — any multihousehold residence group in which households live within shouting distance and cooperate in most subsistence and domestic activities; in our usage the nuclear household is classed as a single household camp

Chapter — Navajo Chapters were originally established as units of agricultural extension services. They have developed into a form of local government analogous to the New England town meetings and have also come to signify community areas. The people of each Chapter elect their own president, vice president, and secretary and attend regular Chapter meetings to deal with community affairs. Each Chapter is eligible for the construction of a Chapter House in which to conduct meetings. In 1974, the Navajo Tribe recognized 102 Chapters.

consanguinal — relationship through common ancestry

continuous-area enumeration — a technique for obtaining a non-random sample which identifies for interviewing purposes all individuals or families living in a given area.

diachronic — considering phenomena as they occur, change, or develop over time

extended family — a domestic group consisting of two or more nuclear families affiliated through an extension of the parent-child relationship rather than of the husband-wife relationship, i.e., by joining the nuclear family of a married adult to that of his parents; most Navajo camps are extended families

land management units — also called land management districts, these are BIA

	administrative divisions of the Navajo Reservation primarily for range management purposes. There are currently 23 such divisions including the Ramah and Canyoncito Navajo Reservations.
land-use community	a group of consanguinal and affinal relatives who regularly cooperate for such purposes as sheep-shearing, horse-gelding, conducting ceremonies, etc., who live in a contiguous geographical area. According to Kluckhohn and Leighton (1946:63), land use communities occupy from 12,000 to 85,000 acres and may include from 50 to 200 persons.
matrilineal descent	referring to the transmission of authority, inheritance, or descent, primarily through females
matrilocal camp	a multihousehold residence group comprised of a senior parent couple, their unmarried offspring, and one or more households formed by this couple's married daughters, their spouses, and dependent children
matrilocal residence	a post-nuptial residence rule which requires the groom to leave the household of his parents and to establish residence in or near the household of the bride's parents
mean ($\bar{X}$)	the sum of the scores divided by the total number of valid cases (n)
median	a value in an ordered set of values below and above which there are an equal number of values
multiplier effect	the creation of revenue-producing enterprises and other economic transactions resulting from a major economic development
n	number of valid cases or observations for a particular variable
N	total sample size
neolocal residence	residence in which a married couple establishes a household which is independent of and at some distance from that of the parents of either spouse
nuclear family	a parent couple and their offspring; most households in this study are comprised

	of single nuclear families
OEO	Office of Economic Opportunity
random sample	a sample drawn in such a way that each possible combination of n items in the population has the same chance of being in the sample actually drawn
sheep unit	a sheep unit is based on the amount of forage consumed by one sheep per year, and a sheep permit specifies the number of sheep units which may be grazed; a sheep or a goat is equal to one sheep unit, a horse is equivalent to five sheep units, and a bovine is equal to four sheep units
stock reduction	a federal program aimed at reducing Navajo livestock holdings in an effort to preserve the range land which was seriously overgrazed; from 1933 to 1936 the program was voluntary, but between 1937 and 1941 a systematic reduction and regulation program was inaugurated; the transformation of the subsistence economy which occurred after 1936 was pervasive and the experience, for the Navajo, was devastating.
synchronic	concerned with the complex of events existing in a limited time period

APPENDIX

APPENDIX

METHOD USED FOR ESTIMATION OF TOTAL HOUSEHOLD INCOME

In this Appendix, estimated total household income is reported for the 12 months prior to interview. Initially, the variable was conceived as an estimate by the informant of the total income of his or her household for the previous year. We found, however, that almost all our informants had no idea of the amount of their total income from all sources, although they usually could estimate income from specific sources such as wage income, wool sales, or craft income. The variable therefore evolved into an estimate made by the anthropologist during the coding procedure of the total income for the household from all sources.

This estimate was made by adding values for several variables. The first variable used was total earned income of household for the 12 months prior to the interview. This variable is composed of all the wage inputs to the household from various sources, including the total wage income of household head (male or female) for the past year, the total wage income of spouse of household head, and the total annual earned income of other employed individuals for the past 12 months.

The total amount of unearned income from all sources was then added to the annual amount earned from wages. Total unearned income was calculated by summing all sources of unearned income, including such major sources as general assistance, social security, pensions, and unemployment insurance.

The total dollar amounts received from sale of livestock and livestock products (not including estimates of home consumption) were also added to the wage and unearned incomes. The inputs to total stock income include dollar amount from lamb sales, total dollar amount received from cattle sales, and total dollar amount received from wool sales for the 12 months prior to the interview.

Also added to these sources of income was income from crafts. This includes income from craft products such as rugs and jewelry and from other craft products such as safety-pin jewelry and beadwork. Finally, other sources of income such as ceremonial activities were noted, and estimates from these sources were added to the total household income.

In addition, estimates based on information gathered from other interviews were sometimes made. For example, the spouse of a household head often knew her husband's occupation yet did not know the income he received. Previous interviews and company pay scales allowed us to ascertain the hourly wage for that particular occupation. With this information, and knowledge of how long an individual had been working, we could calculate a wage income for that individual. Similarly, there were cases on Black Mesa where we knew that certain households received some form of unearned income but we could not find out how much income was received. Interpolations could be made based on data gathered from other sources because many of these sources of unearned income were standardized in their payments.

The summary household income variable represents the best estimate of a household's income based upon information gathered from the interview of that specific

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household, as well as on information gathered on similar topics from other household interviews. When the amount of a major source of income for a particular household was unobtainable, and in cases where interpolation from other sources seemed inadvisable, the variable of total household income was coded as "no information."

Table 1: Age of Household Head by Sex

	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant*
Age in Years	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
15-19	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2
20-24	1	-	2	-	-	-	5	-	5	-	4	-	3	-	8	1	6
25-29	5	-	4	-	1	-	4	1	7	-	4	1	3	1	11	1	11
30-34	6	1	1	-	-	1	5	1	4	-	8	-	2	-	6	-	6
35-39	4	-	6	-	-	-	8	3	3	-	9	-	4	1	-	-	4
40-44	5	2	1	3	-	-	2	3	2	-	3	-	1	-	3	-	-
45-49	4	2	6	-	-	-	6	4	1	-	2	-	1	-	2	-	-
50-54	4	-	1	-	1	-	2	1	-	-	1	-	2	-	-	-	-
55-59	7	4	2	-	-	1	1	2	-	2	2	-	1	-	-	-	2
60-64	3	-	-	1	3	1	4	1	-	-	-	-	1	-	-	-	-
65-69	2	-	2	1	2	-	2	2	-	-	-	-	-	1	1	-	-
70-74	2	2	2	-	1	-	-	-	-	-	-	-	1	-	-	-	-
75-79	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
80+	2	-	1	2	-	-	1	-	-	-	-	-	-	-	-	-	-
Mean	47.8	52.7	46.0	60.0	59.1	50.0	42.2	46.8	30.2	56.0	35.7	22.0	38.6	53.2	30.6	26.5	28.8
Median	46.0	55.0	45.0	61.0	62.5	57.0	37.5	45.5	29.0	56.0	35.0	22.0	37.0	53.0	27.0	26.5	26.5
n	46	11	29	7	8	3	40	18	22	2	33	2	19	4	31	2	31
No information	3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
N	49	11	29	7	8	3	40	18	22	2	34	2	19	4	31	2	31

*No female household heads in this sample.

Table 2: Age of Spouse of Household Head

Age in Years	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
15-19	-	-	1	-	2	1	1	-	-
20-24	3	2	-	6	9	4	3	7	9
25-29	6	6	-	5	4	9	3	8	8
30-34	9	3	-	3	3	9	3	4	3
35-39	3	3	-	9	2	3	3	-	2
40-44	7	5	-	5	1	3	1	4	-
45-49	5	3	3	4	1	1	3	-	2
50-54	8	2	2	4	-	2	1	-	-
55-59	2	3	1	1	-	-	1	1	-
60-64	5	-	1	1	-	-	-	-	-
65+	-	-	-	-	-	-	-	-	-
Mean	41.6	38.5	48.0	37.4	26.9	32.2	34.6	29.7	28.8
Median	41.5	39.0	51.5	37.5	24.5	31.0	32.0	27.0	26.5
n	48	28	8	38	22	32	19	24	24
No information	1	1	-	1	-	2	-	-	1
N	49	29	8	39	22	34	19	24	25

Table 3: Years of Education of Household Head by Sex

Education in Years	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant*
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
0	16	9	11	7	4	-	10	9	2	1	5	-	5	4	1	-	2
1-4	7	1	3	-	-	2	2	2	-	-	3	-	1	-	1	-	2
5-7	11	1	4	-	1	1	4	1	3	-	6	1	6	-	4	1	6
8	4	-	1	-	-	-	3	1	-	-	1	-	1	-	1	-	2
9-11	3	-	3	-	1	-	5	3	2	-	4	-	2	-	1	-	2
12	5	-	2	-	1	-	10	1	10	1	9	-	3	-	18	1	9
13-15	1	-	1	-	-	-	4	1	3	-	6	1	1	-	6	-	8
16	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
17+	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Mean	4.7	0.9	4.4	0	4.1	4.7	7.3	4.2	10.6	6.0	8.3	9.5	5.9	0	10.8	8.5	9.7
Median	5.0	0	2.0	0	0	4.0	8.5	1.0	12.0	6.0	9.5	9.5	5.0	0	12.0	8.5	12.0
n	47	11	25	7	7	3	38	18	22	2	34	2	19	4	32	2	31
No information	2	-	4	-	1	-	2	-	-	-	-	-	-	-	-	-	-
N	49	11	29	7	8	3	40	18	22	2	34	2	19	4	32	2	31

*No female household heads in this sample.

Table 4: Years of Education of Spouse of Household Head

Education in Years	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
0	28	16	5	14	4	4	6	-	5
1-4	1	1	-	3	-	-	3	-	-
5-7	9	1	2	4	2	9	2	3	3
8	5	-	-	2	2	4	1	1	2
9-11	4	2	1	9	3	6	4	4	4
12	1	4	-	15	9	6	3	10	7
13-15	-	1	-	2	2	5	-	6	3
16	-	-	-	-	-	-	-	-	1
17+	-	-	-	-	-	-	-	-	-
Mean	3	3.7	2.6	5.8	8.9	8.3	5.4	11.3	8.8
Median	0	0	0	5.0	11.5	8.5	5.0	12.0	11.0
n	48	25	8	39	22	34	19	24	25
No information	1	4	-	-	-	-	-	-	-
N	49	29	8	39	22	34	19	24	25

Table 5: Marital Status of Household Head by Sex
(in percent)

	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant*
Marital Status	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Single	-	-	-	-	-	-	-	-	-	-	3	-	-	25	16	100	16
Married	100	-	93	14	100	-	98	-	100	-	97	-	100	-	77	-	81
Divorced	-	36	3	29	-	-	2	67	-	-	-	-	-	-	3	-	3
Separated	-	-	-	-	-	67	-	-	-	-	-	50	-	25	3	-	-
Widowed	-	64	3	57	-	33	-	33	-	100	-	50	-	50	-	-	-
Total	100	100	99	100	100	100	100	100	100	100	100	100	100	100	99	100	100
N	49	11	29	7	8	3	40	18	22	2	34	2	19	4	31	2	31

*No female household heads in this sample.

Table 6: Number of Marriages of Household Head by Sex

Number of Marriages	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant*
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	2	5
1	22	7	19	3	5	3	26	7	19	1	28	2	11	3	23	-	21
2	22	3	6	3	3	-	11	6	3	1	5	-	7	-	2	-	5
3	3	1	2	-	-	-	1	5	-	-	1	-	1	-	-	-	-
4+	-	-	1	1	-	-	1	-	-	-	-	-	-	-	1	-	-
Mean	1.7	1.5	1.5	1.9	1.4	1.0	1.4	1.9	1.1	1.5	1.2	1.0	1.5	0.8	1.0	-	1.0
n	47	11	28	7	8	3	39	18	22	2	34	2	19	4	31	2	31
No information	2	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
N	49	11	29	7	8	3	40	18	22	2	34	2	19	4	31	2	31

*No female household heads in this sample.

Table 7: Number of Marriages of Spouse of Household Head

Number of Marriages	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
1	25	22	8	27	18	31	17	24	23
2	21	5	-	11	4	3	2	1	2
3	1	-	-	1	-	-	-	-	-
4+	1	-	-	-	-	-	-	-	-
Mean	1.6	1.2	1.0	1.3	1.2	1.1	1.1	1.0	1.1
n	48	27	8	39	22	34	19	25	25
Not applicable	11	7	3	18	2	2	4	8	6
No information	1	2	-	1	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 8: Marriage with Non-Navajos

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households in which an adult is or has been married to a non-Navajo	7%	11%	-	12%	4%	19%	-	27%	4%
n	60	35	11	58	24	36	22	26	26
Not applicable	-	1	-	-	-	-	-	7	5
No information	-	-	-	-	-	-	1	-	-
N	60	36	11	58	24	36	23	33	31
Percent of households with non-Navajo members in residence at time of interview	2%	8%	-	9%	4%	14%	-	21%	3%
n	60	36	11	58	24	36	23	33	31
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 9: Religious Affiliation of Household Heads and Spouses by Sex
(in percent)

Religious Affiliation	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Christian	30	30	48	47	25	27	21	31	28	56	50	63	23	31	57	76	43	61
Fundamentalist	(24)	(25)	(28)	(32)	(25)	(27)	(11)	(20)	(7)	(11)	(32)	(48)	(17)	(22)	(25)	(32)	(13)	(22)
Other Protestant	(2)	(2)	-	(3)	-	-	(5)	(2)	(7)	(33)	(15)	(15)	(6)	(9)	(7)	(8)	(10)	(18)
Catholic	-	-	(20)	(12)	-	-	-	(2)	(14)	(6)	(3)	-	-	-	(11)	(16)	(10)	(11)
Mormon	(4)	(3)	-	-	-	-	(5)	(7)	-	(6)	-	-	-	-	(14)	(20)	(10)	(10)
Indian religion	50	53	52	44	63	63	34	31	71	38	36	27	67	56	32	24	39	34
Traditional	(12)	(16)	(32)	(32)	-	(9)	(24)	(20)	(64)	(27)	(15)	(18)	(39)	(35)	(7)	(12)	(23)	(17)
NAC*	(14)	(19)	(20)	(12)	(25)	(18)	-	(4)	-	-	(18)	(6)	(6)	(4)	(7)	(8)	(6)	-
NAC and Traditional	(24)	(18)	-	-	(38)	(36)	(10)	(7)	(7)	(11)	(3)	(3)	(22)	(17)	(18)	(4)	(10)	(17)
Other combination	8	9	-	-	13	9	26	24	-	6	3	3	-	-	-	-	3	6
No Affiliation	11	9	-	9	-	-	18	13	-	-	12	6	11	13	11	-	16	-
Total	99	101	100	100	101	99	99	99	99	100	101	99	101	100	100	100	101	101
n	49	57	25	34	8	11	38	55	14	18	34	33	18	23	28	25	31	18
Not applicable	11	-	7	-	3	-	18	1	2	2	2	2	4	-	2	5	-	7
No information	-	3	4	2	-	-	2	2	8	4	-	1	1	-	3	3	-	6
N	60	60	36	36	11	11	58	58	24	24	36	36	23	23	33	33	31	31

*Native American Church

Table 10: Population and Household Size

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Total population:									
Year round	309	199	55	326	116	178	96	129	115
Including children away at school	373	211	59	355	118	215	130	136	120
Total number of households	60	36	11	58	24	36	23	33	31
Household size:									
Mean (year round)	5.2	5.5	5.0	5.6	4.8	4.9	4.2	3.9	3.7
Mean (including children away at school)	6.2	5.9	5.4	6.1	4.9	6.0	5.7	4.1	3.9
Distribution of households by number of members (year round)									
1	2	2	2	5	-	1	-	7	6
2	7	4	1	7	2	2	4	2	1
3	6	5	2	4	6	7	7	5	8
4	9	3	-	9	5	6	4	4	6
5	10	3	1	8	4	9	2	10	5
6	11	3	2	4	3	2	3	2	2
7	4	9	1	6	1	4	2	-	2
8	5	-	-	3	1	2	-	2	1
9	5	4	-	4	-	3	1	1	-
10	1	3	1	1	1	-	-	-	
11	-	-	1	4	1	-	-	-	-
12	-	-	-	1	-	-	-	-	-
13	-	-	-	1	-	-	-	-	-
14	-	-	-	1	-	-	-	-	-
Percent of households with children away at school	45%	22%	27%	19%	8%	22%	35%	12%	10%
Percent of households with transients	17%	25%	27%	22%	8%	31%	13%	21%	6%

Table 11: Household Composition
(in percent)

Household Type	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Single individual	3	-	10	7	-	-	-	21	19
Single family									
Nuclear	58	54	50	34	79	69	48	67	65
Remnant	12	17	-	21	8	-	9	-	3
Conjugal pair	3	6	20	3	4	3	9	-	3
Nuclear plus other individual	2	-	-	5	4	-	-	-	-
Multiple family									
Extended	10	11	-	9	-	6	13	-	3
Joint	-	3	20	-	4	19	22	9	3
Other	12	9	-	21	-	3	-	3	3
Total	100	100	100	100	99	100	101	100	99
n	60	35	10	58	24	36	23	33	31
No information	-	1	1	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

NOTE: Transients not included.

Table 12: Length of Residence in Sample Area
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Family not in the area, only household head	-	3	10	-	-	3	-	21	68
Years in area									
1-2	2	6	10	9	13	36	44	52	32
2-4	-	-	10	11	9	6	9	15	-
5-8	2	-	-	2	4	6	4	6	-
9-20	3	3	-	12	4	14	26	3	-
21+	5	3	-	21	-	-	4	-	-
Indigenous	88	86	70	45	70	36	13	3	-
Total	100	101	100	100	100	101	100	100	100
n	60	36	10	56	23	36	23	33	31
No information	-	-	1	2	1	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 13: Prior Residence of Household
(in percent)

Area of Prior Residence	Red Lake (Dist. 1)	Black Mesa (Dist. 2,4)	Lechee G. D. (Dist. 1)	Tuba City (Dist. 3)	Kayenta (Dist. 8)	Lechee Chapter (Dist. 1)	Route 89 (Dist. 1)	Page	Power Plant Dist. 1)
District Number 1	10	6	-	15	-	17	26	15	19
2	-	-	-	2	9	3	-	-	3
3	2	-	10	24	-	3	35	-	10
4	-	-	-	-	-	-	-	-	3
5	-	-	-	2	-	-	4	3	-
7	-	-	-	-	-	6	-	-	10
8	-	3	-	4	9	3	-	3	6
9	-	-	-	-	-	-	-	3	-
10	-	6	-	-	4	-	-	6	-
11	-	-	-	-	-	-	-	-	-
12	-	-	-	-	4	-	-	6	-
13	-	-	-	-	-	-	-	-	3
14	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	3	-	-	3
16	-	-	-	-	-	-	4	-	-
17	-	-	10	2	-	3	9	3	6
18	-	-	-	-	-	-	-	6	16
Off-reservation	-	-	10	4	4	26	9	52	19
Indigenous	88	86	70	49	70	37	13	3	-
Total	100	101	100	102	100	101	100	100	98
n	60	35	10	55	23	35	23	33	31
No information	-	1	1	3	1	1	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 14: Camp Size

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Number of households per camp									
1	25	9	9	32	15	26	9	32	26
2	11	12	1	12	4	2	1	-	3
3	4	3	-	2	2	1	1	-	1
4	1	-	-	2	-	-	2	-	1
5	-	1	-	-	-	1	1	-	-
Mean number of households per camp	1.5	1.9	1.1	1.5	1.4	1.2	1.9	1.0	1.3
n	41	25	10	48	21	30	14	32	31
No information	3	1	-	-	-	1	-	1	-
N	44	26	10	48	21	31	14	33	31

Table 15: Camp Composition
(in percent)

Camp Type	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Independent (single household)	61	36	90	66	71	87	64	100	90
Matrilocal	10	24	-	13	19	-	21	-	3
Patrilocal	7	16	-	7	5	7	-	-	-
Mixed (matrilocal and patrilocal)	4	8	10	4	-	3	7	-	7
Matrilocal and other	2	4	-	2	-	-	-	-	-
Patrilocal and other	-	4	-	-	-	-	-	-	-
Siblings	2	8	-	7	-	3	-	-	-
Other	13	-	-	2	5	-	7	-	-
Total	99	100	100	101	100	100	99	100	100
n	41	25	10	48	21	30	14	32	29
Not applicable	-	-	-	-	-	-	-	-	-
No information	3	1	-	-	-	1	-	1	2
N	44	26	10	48	21	31	14	33	31

Table 16: Community of Residence Prior to Marriage
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Male and female from same community	35	27	63	31	33	26	55	5	41
Male from adjacent community	30	27	12	31	29	11	30	21	18
Male from distant community	4	23	-	23	24	34	10	47	12
Female from adjacent community	26	15	12	8	-	9	-	5	6
Female from distant community	4	8	12	8	14	20	5	21	24
Total	99	100	99	101	100	100	100	99	101
n	46	26	8	26	21	35	20	19	17
Not applicable	4	7	-	7	1	1	2	13	10
No information	10	3	3	25	2	-	1	1	4
N	60	36	11	58	24	36	23	33	31

Table 17: Patterns of Cooperation in Hauling Wood and Water
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Wood and water for the camp hauled by:									
Household in the camp	63	85	73	40	70	88	91	100	88
Relatives outside camp	15	12	18	16	10	8	-	-	-
Non-relatives	14	-	-	32	10	-	9	-	-
Both household in camp and other relatives	2	-	9	4	-	-	-	-	12
Both household in camp and non-relatives	5	-	-	4	-	4	-	-	-
Both relatives and non-relatives	2	-	-	4	10	-	-	-	-
Household in camp, relatives and non-relatives	-	3	-	-	-	-	-	-	-
Total	101	100	100	100	100	100	100	100	100
n	59	34	11	25	10	25	23	1	16
Not applicable	1	-	-	33	14	11	-	32	15
No information	-	2	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 18: Pooling Livestock with People in other Camps

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Number of households with livestock*	42	27	10	16	10	16	14	23	13
Percent of households pooling herds	40%	19%	20%	87%	-	75%	57%	91%	92%
Number of households pooling	17	5	2	14	-	12	8	21	12
Percent pooling with:									
Wife's family	76%	60%	100%	57%	-	33%	63%	43%	25%
Husband's family	12%	20%	-	43%	-	33%	38%	24%	58%
Relatives of both husband and wife	6%	-	-	-	-	8%	-	14%	8%
Natal family (for single males only)	-	-	-	-	-	8%	-	19%	-
Other people	6%	20%	-	-	-	16%	-	-	8%
Not applicable (no livestock)	17	7	1	41	7	20	9	10	18
No information	1	2	-	1	7	-	-	-	-
N	60	36	11	58	24	36	23	33	31

*Excludes households with only horses.

Table 19: Per Capita and Total Sample Income by Source

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
N POP*	325	202	56	333	116	187	104	131	116
Per capita wage income	$ 425	$ 808	$1,311	$ 652	$1,566	$1,828	$1,681	$3,033	$2,497
Per capita stock income	$ 46	$ 67	$ 82	$ 23	$ 6	$ 33	$ 27	$ 6	$ 18
Per capita unearned income	$ 345	$ 168	$ 105	$ 294	$ 76	$ 132	$ 137	$ 56	$ 73
Per capita craft income	$ 23	$ 11	$ 7	$ 27	$ 5	$ 24	$ 93	$ 9	$ 13
Total per capita income	$ 857	$1,054	$1,505	$1,045	$1,693	$2,008	$1,955	$3,103	$2,606
Per capita consumption	$ 38	$ 54	$ 99	$ 4	$ 2	$ 41	$ 58	$ 18	$ 10
Total per capita income including consumption	$ 895	$1,108	$1,604	$1,049	$1,695	$2,049	$2,013	$3,121	$2,616
Proportion of total income from:									
Wage	50%	77%	87%	62%	92%	91%	86%	98%	96%
Stock	5%	6%	5%	2%	1%	2%	1%	< 1%	1%
Unearned	40%	16%	7%	28%	4%	6%	7%	2%	3%
Craft	3%	1%	1%	3%	1%	1%	5%	< 1%	<1%
Other sources	2%	-	-	5%	2%	-	1%	-	-

*N POP is the per capita number for each sample; it is formulated by adding ½ of the children away at school to the total permanent household size.

Table 20: Wage Income

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lochee Chapter	Route 89	Page	Power Plant
Percent of households with earned income	58%	62%	100%	65%	87%	97%	96%	100%	100%
Mean wage income for households with wage income	$3,945	$7,253	$6,676	$5,737	$8,740	$9,782	$7,984	$12,017	$9,364
Median wage income for households with wage income	$3,490	$6,650	$3,969	$4,690	$8,930	$8,590	$6,082	$11,525	$8,630
Mean wage income for all households in sample	$2,301	$4,533	$6,676	$3,759	$7,600	$9,511	$7,637	$12,017	$9,364
Per capita* wage income for sample	$ 425	$ 808	$1,311	$ 652	$1,566	$1,828	$1,681	$ 3,033	$2,497

*Per capita is arrived at by summing year round population and adding to this ¼ of the children temporarily away at boarding school.

Table 21: Employment of Male Household Head at Time of Interview
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Wage work	28	60	50	50	86	65	68	90	97
Stock raising	10	17	13	3	-	3	5	-	-
Not working	48	7	13	38	14	32	21	10	3
Retired	13	17	25	10	-	-	5	-	-
Total	99	101	101	101	100	100	99	100	100
n	47	30	8	40	22	34	19	31	31
Not applicable	13	6	3	18	2	2	4	2	-
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 22: Employment of Female Household Head at Time of Interview
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Wage work	9	-	-	6	50	50	50	100	-
Stock raising	45	17	67	6	-	-	-	-	-
Not working	45	83	33	89	50	50	50	-	-
Total	99	100	100	101	100	100	100	100	-
n	11	6	3	18	2	2	4	2	-
Not applicable	49	30	8	40	22	34	19	31	31
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 23: Employment of Spouse of Household Head at Time of Interview
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Wage work	6	4	38	18	-	16	16	24	28
Stock raising	21	37	38	-	5	3	16	-	-
Not employed	73	59	25	82	95	81	68	76	72
Total	100	100	101	100	100	100	100	100	100
n	48	27	8	39	22	32	19	25	25
Not applicable	12	9	3	19	2	2	4	8	6
No information	-	-	-	-	-	2	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 24: Type of Employer for the Most Recent Job of Household Head (Regardless of Sex)
(in percent)

Type of Employer	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Self employed	31	26	37	3	-	-	9	-	-
Tribal	21	11	37	34	13	19	5	3	-
Federal	5	-	-	38	9	6	-	9	-
Small business	10	4	-	9	13	8	23	9	-
Power industry	21	48	13	3	61	58	64	76	100
Large business	12	-	-	6	4	3	-	3	-
State	-	7	-	6	-	6	-	-	-
Other	-	4	13	-	-	-	-	-	-
Total	100	100	100	99	100	100	101	100	100
n	42	27	8	32	23	36	22	33	31
Not applicable	18	9	3	26	1	-	1	-	-
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 25: Type of Employer for the Most Recent Job of the Spouse of Household Head
(in percent)

Type of Employer	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Self employed	75	91	38	-	25	-	44	-	-
Tribal	13	-	-	23	25	12	-	-	9
Federal	6	-	13	69	25	8	11	29	55
Small business	-	9	50	8	25	36	44	35	36
Power industry	-	-	-	-	-	4	-	12	-
Large business	6	-	-	-	-	20	-	12	-
State	-	-	-	-	-	16	-	6	-
Other	-	-	-	-	-	4	-	6	-
Total	100	100	101	100	100	100	99	100	100
n	16	11	8	13	4	25	9	17	11
Not applicable	44	24	3	45	18	9	14	14	20
No information	-	1	-	-	2	2	-	2	-
N	60	36	11	58	24	36	23	33	31

Table 26: Occupation, by Type and Level, for most Recent Job of Household Head
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Professional & Business									
Professional 1	-	-	-	-	-	-	-	-	-
Professional 2	-	-	-	-	-	-	-	-	-
Professional 3	-	6	-	7	4	-	-	-	3
Proprietors & managers 1	-	-	-	-	-	-	-	-	-
Proprietors & managers 2	-	-	-	-	-	-	-	-	-
Proprietors & managers 3	-	-	-	-	-	-	-	-	-
Business men 1	-	-	-	-	-	-	-	-	-
Business men 2	-	-	-	-	-	-	-	-	-
Business men 3	-	-	-	-	-	-	-	-	-
Total	-	6	-	7	4	-	-	-	3
Clerical									
Clerk 1	-	-	-	-	-	-	-	-	-
Clerk 2	-	-	-	-	-	3	-	-	-
Clerk 3	-	6	-	-	-	-	4	6	-
Clerk 4	2	-	-	2	-	-	-	-	19
Clerk 5	-	-	-	2	-	-	-	-	-
Total	2	6	-	4	-	3	4	6	19

Table 26: Occupation, by Type and Level, for most Recent Job of Household Head (continued)
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Farmers									
Farmers 1	-	-	-	-	-	-	-	-	-
Farmers 2	-	-	-	-	-	-	-	-	-
Farmers 3	-	3	-	-	-	-	-	-	-
Farmers 4 (tenant 1)	3	9	27	2	-	-	-	-	-
Farmers 5 (tenant 2)	12	6	-	-	-	-	9	-	-
Total	15	18	27	2	-	-	9	-	-
Laborers									
Manual labor 1	-	-	-	-	-	-	-	-	-
Manual labor 2	2	-	-	5	-	3	4	24	13
Manual labor 3	10	3	-	-	17	25	9	42	16
Manual labor 4	12	12	18	-	38	11	4	9	16
Heavy labor	12	9	9	3	8	42	48	-	19
Migrant labor	2	-	9	10	-	-	-	-	-
Total	38	24	36	18	63	81	65	75	64

Table 26: Occupation, by Type and Level, for most Recent Job of Household Head (continued)
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Protective & service workers									
Protective & service 1	-	-	-	2	-	-	-	-	-
Protective & service 2	7	-	-	14	8	-	-	6	-
Protective & service 3	8	9	9	9	17	8	-	6	-
Protective & service 4	2	12	-	-	4	8	17	6	13
Total	17	21	9	25	29	16	17	18	13
Housewife	7	12	-	19	4	-	-	-	-
Disabled	12	-	-	16	-	-	-	-	-
Unemployed	10	15	27	10	-	-	4	-	-
Grand total	101	102	99	101	100	100	99	99	99
N	60	34	11	58	24	36	23	33	31

Table 27: Occupation, by Type and Level, for most Recent Job of Spouse of Household Head
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Professional & business									
Professional 1	-	-	-	-	-	-	-	-	-
Professional 2	-	-	-	-	-	-	-	4	8
Professional 3	-	-	-	-	5	-	-	-	-
Proprietors & managers 1	-	-	-	-	-	-	-	-	-
Proprietors & managers 2	-	-	-	-	-	-	-	-	-
Proprietors & managers 3	-	-	-	-	-	-	-	-	-
Business men 1	-	-	-	-	-	-	-	-	-
Business men 2	-	-	-	-	-	-	-	-	-
Business men 3	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	5	-	-	4	8
Clerical									
Clerk 1	-	-	-	-	-	-	-	-	-
Clerk 2	-	-	-	-	-	-	-	-	-
Clerk 3	-	4	-	-	-	-	-	-	-
Clerk 4	2	-	-	-	-	6	-	16	8
Clerk 5	-	4	-	-	5	3	5	4	8
Total	2	8	-	-	5	9	5	20	16

Table 27: Occupation, by Type and Level, for most Recent Job of Spouse of Household Head (continued)
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Farmers									
Farmers 1	-	-	-	-	-	-	-	-	-
Farmers 2	-	-	-	-	-	-	-	-	-
Farmers 3	-	4	-	-	-	-	-	-	-
Farmers 4 (tenant 1)	6	14	25	-	5	-	5	-	-
Farmers 5 (tenant 2)	19	18	13	-	-	-	16	-	4
Total	25	36	38	-	5	-	21	-	4
Laborers									
Manual labor 1	-	-	-	-	-	-	-	-	-
Manual labor 2	-	-	-	-	-	-	-	-	-
Manual labor 3	-	-	-	-	-	9	-	-	-
Manual labor 4	-	-	-	-	-	9	-	4	-
Heavy labor	-	-	-	-	-	3	-	4	-
Migrant labor	2	-	-	-	-	-	-	-	-
Total	2	-	-	-	-	21	-	8	-

Table 27: Occupation, by Type and Level, for most Recent Job of Spouse of Household Head (continued)
(in percent)

Type of Employment	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Protective & service									
Protective & service 1	-	-	-	-	-	-	-	-	4
Protective & service 2	-	-	-	21	10	6	-	36	4
Protective & service 3	2	-	-	10	-	12	5	4	8
Protective & service 4	2	-	63	3	-	27	16	4	4
Total	4	4	63	34	10	45	21	44	20
Housewife	67	50	-	67	75	21	47	24	52
Retired/disabled	-	-	-	-	-	-	-	-	-
Unemployed	2	4	-	-	-	3	5	-	-
Grand total	102	102	101	101	100	99	99	100	100
N	48	28	8	39	20	33	19	25	25

Table 28: Location of Job of Household Head
(in percent)

Location	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
On reservation, area of residence	53	89	75	90	91	72	77	55	10
On reservation, other	13	7	-	-	-	3	5	30	90
Off/on reservation, Page	18	4	13	3	4	19	18	15	-
Off reservation, border	2	-	-	-	-	3	-	-	-
Off reservation, distant	13	-	13	6	4	3	-	-	-
Total	99	100	101	99	99	100	100	100	100
n	45	27	8	33	23	36	22	33	31
Not applicable	15	9	3	25	1	-	1	-	-
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 29: Income and Months of Employment for Most Recent Job of Household Head (Regardless of Sex)

	Red Lake	n*	Black Mesa	n	Lechee G. D.	n
Mean number of months employed on present job	26.5	28	37.4	25	42.5	8
Mean monthly wage	$ 539	29	$ 694	18	$ 446	5
Mean earned income this year	$4,117	28	$7,122	19	$3,895	7
Mean number of months employed during past two years	11.8	37	15	36	15.1	9

*n represents number of households for which there was information.

Table 29: Income and Months of Employment for Most Recent Job of Household Head (Regardless of Sex) (continued)

	Tuba City	n*	Kayenta	n	Lechee Chapter	n	Route 89	n	Page	n	Power Plant	n
Mean number of months employed on present job	33	31	29.8	22	15.5	36	16.6	22	16.0	33	7.5	28
Mean monthly wage	$ 483	30	$ 693	23	$ 792	35	$ 814	19	$ 1,044	33	$ 842	31
Mean earned income this year	$5,067	30	$8,203	21	$7,409	34	$7,439	20	$10,439	33	$7,874	31
Mean number of months employed during past two years	15.3	38	22	23	17.7	36	12.8	23	22.6	31	20.2	30

*n represents number of households for which there was information.

Table 30: Income and Months of Employment for Most Recent Job of Spouse of Household Head

	Red Lake	n*	Black Mesa	n	Lechee G. D.	n
Mean number of months employed on present job	14.5	4	**		40.8	8
Mean monthly wage	$ 286	4	**		$ 241	5
Mean unearned income this year	$3,120	3	$ 944	2	$1,412	5

*n represents number of households for which there was information.

**No information.

Table 30: Income and Months of Employment for Most Recent Job of Spouse of Household Head (continued)

	Tuba City	n*	Kayenta	n	Lechee Chapter	n	Route 89	n	Page	n	Power Plant	n
Mean number of months employed on present job	41	13	**		20.6	25	52.2	9	21.9	19	40.2	10
Mean monthly wage	$ 416	13	**		$ 340	23	$ 281	5	$ 372	19	$ 428	11
Mean earned income this year	$3,436	10	$3,183	2	$2,800	18	$1,903	5	$2,663	12	$4,129	10

*n represents number of households for which there was information.

**No information.

Table 31: Income and Months of Employment for Most Recent Job of Other Employed Individual

	Red Lake	n*	Black Mesa	n	Lechee G. D.	n
Mean number of months employed on present job	7.5	8	**		**	
Mean monthly wage	$ 382	8	**		**	
Mean earned income this year	$2,471	8	$2,233	3	$5,616	8

*n represents number of households for which there was information.

**No information.

Table 31: Income and Months of Employment for Most Recent Job of Other Employed Individual (continued)

	Tuba City	n*	Kayenta	n	Lechee Chapter	n	Route 89	n	Page	n	Power Plant	n
Mean number of months employed on present job	13.3	16	**		**		**		**		4.7	3
Mean monthly wage	$ 407	16	**		**		**		**		$ 497	3
Mean earned income this year	$2,713	15	**		$5,667	9	$2,431	14	$5,173	9	$2,168	3

*n represents number of households for which there was information.

**No information.

Table 32: Unearned Income

Source of Income	Red Lake	n*	Black Mesa	n	Lechee G. D.	n
Aid to Dependent Children	$1,252	28	$1,217	11	-	
Social Security	$1,441	17	$ 852	8	$ 494	2
Emergency Tribal Welfare	$ 678	7	$1,204	9	-	
Unemployment	$ 708	1	$ 360	1	-	
Pensions	$ 900	2	$ 968	2	-	
General Assistance	$2,130	20	-		$1,228	4
Tribal Scholarship	-		-		-	
On the job veteran's benefits	-		-		-	
Other veteran's benefits	$2,040	1	$ 648	1	-	
Other sources	$ 387	2	-		-	
Total unearned income	$2,245	50	$1,416	24	$1,280	5
Per capita unearned income for total sub-sample population**	$ 345	325	$ 168	202	$ 114	56
Percent of all households receiving unearned income	85%		71%		54%	
Percent of all households receiving unearned income from more than one source	32%		23%		18%	

*n represents number of households for which there was information.

**Per capita sub-sample population formulated by adding ½ of the children away at school to the total permanent household size.

Table 32: Unearned Income (continued)

Source of Income	Tuba City	n*	Kayenta	n	Lechee Chapter	n	Route 89	n	Page	n	Power Plant	n
Aid to Dependent Children	$1,410	26	$1,860	1	$ 762	2	$ 899	4	$ 360	2	$ 576	1
Social Security	$1,218	4	$ 921	4	$ 701	3	$ 744	3	$ 960	1	$ 450	1
Emergency Tribal Welfare	$ 840	2	-		-		$ 420	1	-		-	
Unemployment	$ 660	5	$1,200	1	-		$ 364	2	-		$ 389	2
Pensions	$2,988	2	-		-		-		$2,571	1	-	
General Assistance	$2,254	18	$ 960	1	$1,577	8	$ 628	6	$ 220	1	$ 170	1
Tribal Scholarship	-		-		-		-		-		$3,200	2
On the job veteran's benefits	-		$1,104	1	$3,800	1	-		$ 543	4	$ 60	1
Other veteran's benefits	$1,980	2	-		$ 770	1	-		$ 522	1	-	
Other sources	$ 440	2	-		$1,530	2	-		$ 180	1	$ 100	1
Total unearned income	$2,387	41	$1,468	6	$1,760	14	$1,298	11	$ 816	9	$1,066	8
Per capita unearned income for total sub-sample population**	$ 294	333	$ 76	116	$ 132	187	$ 137	104	$ 56	131	$ 73	116
Percent of all households receiving unearned income	69%		25%		39%		50%		27%		26%	
Percent of all households receiving unearned income from more than one source	24%		8%		6%		22%		6%		3%	

*n represents number of households for which there was information.

**Per capita sub-sample population formulated by adding ½ of the children away at school to the total permanent household size.

Table 33: Income from Sale of Sheep and Wool

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households owning livestock	80%	83%	100%	31%	79%	56%	70%	73%	45%
Percent of households owning sheep	70%	80%	91%	26%	57%	33%	48%	40%	29%
Range in number of sheep	3-300	7-340	22-200	4-320	2-125	10-250	15-115	4-176	4-180
Mean number of sheep per sheep owning household	63	78	113	44	34	91.3	44.7	55.4	47.6
Mean number of sheep per household (total sample)	32	63	103	10	17	30.4	21.4	21.8	13.8
Per capita sheep holdings (total sample)	5.9	11.2	20.2	1.7	3.5	5.8	4.7	5.5	3.7
Percent of sheep-owning households which sold wool in the last 12 months	90%	89%	90%	33%	11%	50%	64%	15%	33%
Mean dollar return to sellers from wool sales in the last 12 months	$257	$136	$307	$199	$250	$186	$137	$153	$119
Percent of sheep owners who sold sheep in the last 12 months	53%	50%	44%	7%	6%	42%	73%	13%	11%
Mean number of sheep sold by owners in the last 12 months	6	7	4.6	26	0.2	5.2	10.4	1.2	0.6
Mean dollar return to sellers in the last 12 months	$200	$198	$159	$300	$ 80	$125	$119	$ 79	$113
Mean number of sheep sold per seller in the last 12 months	17.7	14	10.3	26	4	12.4	14.3	15	5

Table 34: Income from the Sale of Cattle

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households owning cattle	33%	64%	64%	25%	42%	31%	30%	42%	23%
Mean number of cattle per cattle owning household	9	18	13	21	5	15.5	7.7	12.8	9.9
Mean number of cattle per household (total sample)	3	11	8.3	3.6	2	4.7	2.3	5.4	2.2
Per capita cattle	0.6	2.0	-	0.6	0.4	0.9	0.5	1.4	0.6
Percent of cattle-owning households which sold cattle in the last 12 months	33%	35%	56%	93%	6%	55%	57%	21%	43%
Mean number of cattle sold per cattle owning household	3.7	6	3.2	5.8	0.1	3.7	0.9	0.5	1.1
Mean dollar return per cattle selling household	$612	$989	$380	$1043	$130	$755	$220	$112	$ 493
Percent of households which sold some livestock	60%	67%	90%	15%	9%	25%	43%	21%	13%
Mean dollar return of households selling livestock and livestock products	$414	$564	$508	$ 839	$355	$682	$279	$114	$511

Table 35: Household Ownership of Horses

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households with horses	68%	72%	100%	24%	42%	47%	61%	52%	35%
Mean number of horses per horse owning household	3.8	3.6	4.2	3.7	2.0	2.9	3.3	4.4	3.6
Mean number of horses per household (total sample)	2.3	2.6	4.2	0.5	0.8	1.4	2.0	2.2	1.3

Table 36: Home Consumption of Livestock and Agricultural Produce

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of all households which consumed stock in the last 12 months	65%	72%	90%	20%	8%	39%	48%	52%	23%
Mean number of stock units consumed per consuming household	12	17	24.7	4.3	49	15.7	19.8	5.1	7.6
Mean dollar value of stock consumed per consuming household*	$313	$417	$617	$106	$1,225	$555	$550	$137	$175
Percent of all households which engage in agriculture	33%	22%	-	10%	17%	14%	5%	6%	16%

*Computed by using dollar value of the animal at time of sale. Cost to family to buy meat in a market or trading post was not used.

Table 37: Craft Income

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households which sold rugs/jewelry	43%	47%	36%	29%	25%	19%	44%	18%	23%
Mean dollar return per weaving household	$164	$123	$125	$496	$ 94	$337	$591	$195	$ 97
Percent of households engaging in other crafts	14%	3%	9%	10%	8%	25%	26%	15%	16%
Mean dollar return of other crafts per craft producing household	$419	$ 80	$200	$ 98	$ 30	$400	$827	$150	$357

Table 38: Number of Vehicles Owned by Household
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
No vehicles	40	33	18	40	25	17	26	12	13
One vehicle	50	56	73	50	63	47	61	67	65
Two or more vehicles	10	11	9	10	12	36	13	21	23
Total	100	100	100	100	100	100	100	100	101
No information	-	-	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 39: Type of Vehicle Owned by Household
(in percent)

	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant	
	Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle	
	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2
Pick-up	70	80	87	25	89	100	80	17	94	33	61	36	87	33	71	-	63	14
Sedan	16	20	13	75	11	-	15	50	6	66	37	64	13	67	29	100	37	57
Other	14	-	-	-	-	-	6	33	-	-	3	-	-	-	-	-	-	28
Total	100	100	100	100	100	100	101	100	100	99	101	100	100	100	100	100	100	99
N	36	5	24	4	9	1	34	6	18	3	31	11	16	3	28	7	27	7

Table 40: Vehicle Insurance by Household
(in percent)

	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant	
	Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle	
	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2
Percent not insured	31	50	10	-	-	-	32	40	-	50	7	33	6	-	18	17	11	50
Percent insured by car dealer	66	50	85	100	100	-	52	60	100	50	79	33	81	100	61	67	67	25
Percent insured by independent	3	-	5	-	-	-	16	-	-	-	14	33	13	-	21	17	22	25
Total	100	100	100	100	100	-	100	100	100	100	100	99	100	100	100	101	100	100
n	35	4	20	2	7	-	31	5	16	2	28	9	16	2	28	6	24	4
No information	1	1	4	2	2	1	3	1	2	1	3	2	-	1	-	1	3	3
N	36	5	24	4	9	1	34	6	18	3	31	11	16	3	28	7	27	7

Table 41: Cost of Vehicle Ownership

	Red Lake						Black Mesa						Lechee G. D.					
	Vehicle One			Vehicle Two			Vehicle One			Vehicle Two			Vehicle One			Vehicle Two		
	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n
Year of manufacture	68.9	70.8	37	66.3	65.5	4	70.2	71.4	23	-	-	-	70.0	69.9	9	70.0	70.0	1
Number of months owned	13.7	10.8	35	11.5	10.5	4	-	-	-	-	-	-	15.0	13.2	9	12.0	12.0	1
Percent of vehicles bought new	57%	-	21	25%	-	1	68%	-	15	100%	-	3	44%	-	4	-	-	-
Percent of vehicles bought used	43%	-	16	75%	-	3	32%	-	7	-	-	-	56%	-	5	100%	-	1
Percent of vehicles paid for at time of interview	31%	-	11	50%	-	2	29%	-	6	-	-	-	-	-	-	-	-	-
Percent of vehicles not paid for at time of interview	69%	-	25	50%	-	2	71%	-	15	100%	-	2	100%	-	7	-	-	-
List price	$2,694	$3,050	27	$ 282	$ 887	3	-	-	-	-	-	-	$3,052	$3,100	5	-	-	-
Amount of down payment	$ 583	$ 550	22	-	-	-	-	-	-	-	-	-	$ 546	$ 493	5	-	-	-
Amount received on trade in	$ 791	$ 565	17	-	-	-	-	-	-	-	-	-	$1,200	$1,200	1	-	-	-
Amount of monthly payments	$ 107	$ 107	31	-	-	-	$ 120	$ 109	15	-	-	-	$ 127	$ 130	6	-	-	-
Amount of unpaid balance	$2,545	$2,637	23	-	-	-	$1,482	$1,523	6	-	-	-	$1,844	$1,266	6	-	-	-
Amount paid on vehicle in the last 12 months	$1,347	$1,164	34	$ 987	$1,035	4	-	-	-	-	-	-	$1,205	$1,240	5	-	-	-
Total vehicle cost	$3,414	$3,874	30	$2,834	$2,464	4	-	-	-	-	-	-	$3,838	$4,158	4	-	-	-

Table 41: Cost of Vehicle Ownership (continued)

	Tuba City						Kayenta						Lechee Chapter					
	Vehicle One			Vehicle Two			Vehicle One			Vehicle Two			Vehicle One			Vehicle Two		
	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n
Year of manufacture	69.4	70.6	33	68.8	68.5	6	71.2	72.6	18	-	-	-	70.0	70.9	31	66.9	66.6	13
Number of months owned	20.2	15.8	31	10.8	6.5	6	12.2	9.5	12	-	-	-	13.5	9.0	31	35.9	29.0	11
Percent of vehicles bought new	59%	-	20	33%	-	2	66%	-	12	50%	-	1	65%	-	20	27%	-	3
Percent of vehicles bought used	41%	-	14	67%	-	4	34%	-	6	50%	-	1	35%	-	11	73%	-	8
Percent of vehicles paid for at time of interview	42%	-	14	-	-	-	32%	-	6	66%	-	2	77%	-	24	77%	-	10
Percent of vehicles not paid for at time of interview	58%	-	19	100%	-	5	68%	-	13	33%	-	1	23%	-	7	23%	-	3
List price	$3,231	$3,864	33	$2,000	$1,412	6	$2,783	$2,850	6	-	-	-	$3,229	$3,675	22	$2,357	$2,575	11
Amount of down payment	$ 449	$ 354	26	-	-	-	$ 821	$ 800	7	-	-	-	$ 736	$ 563	20	$ 414	$ 325	7
Amount received on trade in	$1,110	$1,100	22	-	-	-	-	-	-	-	-	-	$1,076	$ 863	17	$ 797	$ 683	5
Amount of monthly payments	$ 102	$ 105	29	$ 84	$ 90	6	$ 113	$ 114	16	-	-	-	$ 106	$ 104	22	$ 81	$ 82	6
Amount of unpaid balance	$2,817	$2,736	18	$ 575	$ 550	5	$2,174	$1,963	7	-	-	-	$1,967	$1,855	19	$1,193	$1,193	2
Amount paid on vehicle in last 12 months	$1,415	$1,311	27	$ 873	$ 830	6	$1,491	$1,343	10	-	-	-	$1,353	$1,371	26	$ 504	$ 250	11
Total vehicle cost	$4,235	$4,887	31	$2,595	$1,967	5	$3,219	$3,689	6	-	-	-	$4,164	$5,250	18	$1,600	$ 950	4

Table 41: Cost of Vehicle Ownership (continued)

	Route 89						Page						Power Plant					
	Vehicle One			Vehicle Two			Vehicle One			Vehicle Two			Vehicle One			Vehicle Two		
	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n	Mean	Med.	n
Year of manufacture	70.2	70.9	16	69.3	69.0	3	70.0	71.3	28	69.4	69.6	7	69.9	70.4	26	67.0	66.0	5
Number of months owned	16.7	13.0	16	6.7	6.5	3	17.4	10.0	28	25.5	12.5	7	15.5	11.0	26	17.0	15.0	4
Percent of vehicles bought new	71%	-	12	33%	-	1	72%	-	21	57%	-	4	63%	-	17	33%	-	2
Percent of vehicles bought used	29%	-	5	67%	-	2	28%	-	8	43%	-	3	37%	-	10	67%	-	4
Percent of vehicles paid for at time of interview	24%	-	4	33%	-	1	21%	-	6	29%	-	2	27%	-	7	60%	-	3
Percent of vehicles not paid for at time of interview	76%	-	13	67%	-	2	79%	-	23	71%	-	5	73%	-	19	40%	-	2
List price	$3,108	$3,300	16	$1,733	$1,675	3	$3,707	$3,973	15	$3,799	$3,950	4	$3,313	$3,700	19	$1,619	$ 849	5
Amount of down payment	$ 461	$ 450	14	$ 350	$ 350	2	$ 950	$ 631	21	$ 800	$ 850	3	$ 682	$ 675	19	$ 400	$ 400	1
Amount received on trade in	$ 740	$ 525	10	-	-	-	$1,102	$ 999	13	$ 833	$ 850	3	$1,000	$ 775	10	-	-	-
Amount of monthly payments	$ 110	$ 115	13	$ 80	$ 80	2	$ 103	$ 104	24	$ 126	$ 110	5	$ 109	$ 103	23	$ 93	$ 91	3
Amount of unpaid balance	$1,452	$ 907	7	-	-	-	$2,011	$1,862	21	$2,194	$2,174	4	$1,984	$2,270	16	$3,006	$3,006	2
Amount paid on vehicle in last 12 months	$1,717	$1,282	16	$ 799	$ 799	3	$1,687	$1,380	25	$1,290	$1,158	6	$1,378	$1,266	21	$ 549	$ 472	3
Total vehicle cost	$3,469	$3,583	8	$ 800	$ 800	1	$4,488	$5,066	20	$4,053	$4,324	6	$3,801	$4,023	16	$1,034	$ 360	4

Table 42: Households Buying or Selling at only One Store
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of all households selling	78%	94%	82%	41%	29%	43%	78%	36%	33%
n	60	34	11	56	24	36	23	33	31
No information	-	2	-	2	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31
Percent of households selling at only one store	32%	53%	33%	46%	71%	33%	50%	50%	70%
n	47	32	9	23	7	15	18	12	10
Not applicable	23	2	2	33	17	20	5	21	20
No information	-	2	-	2	-	1	-	-	1
N	60	36	11	58	24	36	23	33	31
Percent of households buying at only one store	57%	17%	9%	33%	33%	11%	26%	18%	30%
n	60	35	11	57	24	35	23	33	30
No information	-	1	-	1	-	1	-	-	1
N	60	36	11	58	24	36	23	33	31

Table 43: Households with Credit at more than One Location
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Households with credit	70	80	73	42	29	39	42	40	33
Households with credit at more than one establishment	2	9	-	-	4	9	11	17	21
Credit holding households with credit at more than one establishment	2	11	-	-	14	22	27	42	64
Households with credit cards	2	-	-	10	-	-	27	14	27
n	60	35	11	57	24	36	23	33	30
No information	-	1	-	1	-	-	-	-	1
N	60	36	11	58	24	36	23	33	31

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Table 44: Number of Locations at which Credit is Obtained
(in percent)

	Red Lake			Black Mesa			Lechee G. D.			Tuba City			Kayenta			Lechee Chapter			Route 89			Page			Power Plant		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Trading post	100	100	-	64	67	-	88	-	-	-	-	-	-	-	-	40	-	-	90	100	100	-	-	-	8	-	-
Reservation town	-	-	-	36	33	-	-	-	-	96	-	-	86	100	-	-	-	-	-	-	-	-	-	-	-	-	-
Page	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-	9	14	-	-	-	-
Arizona border town	-	-	-	-	-	-	-	-	-	4	-	-	14	-	-	20	25	-	10	-	-	27	29	20	42	20	40
Other border towns and more distant towns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	50	-	-	-	-	46	43	40	42	60	40
Other	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	7	-	-	-	-	-	18	14	40	8	20	20
Total	100	100	-	100	100	-	100	-	-	100	-	-	100	100	-	100	100	-	100	100	100	100	100	100	100	100	100
n	42	1	-	28	3	-	8	-	-	24	-	-	7	1	-	15	4	-	9	2	1	11	7	5	12	5	5
Not applicable	18	59	60	7	32	35	3	10	10	33	57	58	17	23	24	21	32	36	14	21	22	22	26	28	18	25	25
No information	-	-	-	1	1	1	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
#		60			36			11			58			24			36			23			33			31	

Table 45: Pawn and Loan Transactions
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households with pawn or loan	78	27	72	50	25	47	65	33	39
Pawn only	(76)	(9)	(45)	(41)	(17)	(25)	(48)	(12)	(23)
Loan only	(2)	(15)	(18)	(7)	(8)	(22)	(4)	(15)	(13)
Both pawn and loan	-	(3)	(9)	(2)	-	-	(13)	(6)	(3)
n	59	34	11	58	24	36	23	33	31
No information	1	2	-	-	-	-	-	-	-
N	60	36	11	58	24	36	23	33	31

Table 46: Amount of Pawn or Loan
(in dollars)

	Red Lake	Black Mesa	Lechee C. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Mean	122	194	108	272	73	103	109	92	140
Median	73	138	80	150	68	95	60	93	100
Range	10-800	12-600	25-300	10-1100	30-140	20-250	30-350	20-179	5-500
n	44	6	8	29	3	14	15	9	11
Not applicable	13	25	3	29	18	19	8	22	19
No information	3	5	-	-	3	3	-	2	1
N	60	36	11	58	24	36	23	33	31

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Table 47: Purpose of Pawn or Loan
(in percent)

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Auto expenses	2	14	-	4	-	20	-	10	17
Routine expenses	91	86	75	79	83	53	93	70	58
Repay another loan	-	-	-	4	-	-	7	-	-
Finance a trip	-	-	-	-	-	13	-	10	-
Other	7	-	25	14	16	13	-	10	25
Total	100	100	100	101	99	99	100	100	100
n	45	7	8	28	6	15	15	10	12
Not applicable	13	25	3	29	18	19	8	22	19
No information	2	4	-	1	-	2	-	1	-
N	60	36	11	58	24	36	23	33	31

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Table 48: Repayment of Loans

	Red Lake	Black Mesa	Lechee G. D.	Tuba City	Kayenta	Lechee Chapter	Route 89	Page	Power Plant
Percent of households which repaid loans by time of interview	9%	38%	25%	7%	33%	50%	20%	60%	42%
n	44	8	8	28	6	16	15	10	12
Not applicable	13	25	3	29	18	19	8	22	19
No information	3	3	-	1	-	1	-	1	-
N	60	36	11	58	24	36	23	33	31
Percent of households which were charged interest on pawn or loans	72%	71%	100%	86%	83%	50%	87%	50%	67%
n	43	7	6	28	6	16	15	10	12
Not applicable	13	25	3	29	18	19	8	22	19
No information	4	4	2	1	-	1	-	1	-
N	60	36	11	58	24	36	23	33	31

Table 49: Number of Locations at Which Loan or Pawn Transactions take Place
(in percent)

	Red Lake			Black Mesa			Lechee G. D.			Tuba City			Kayenta			Lechee Chapter			Route 89			Page			Power Plant		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Trading post	80	53	57	29	100	-	57	-	-	25	50	50	17	-	-	19	-	-	27	33	-	18	50	100	-	-	-
Reservation town	9	24	14	43	-	-	14	-	-	50	30	25	67	-	-	-	-	-	13	-	-	9	25	-	17	-	-
Page	2	-	-	-	-	-	29	-	-	-	-	-	-	-	-	25	-	-	13	-	-	9	25	-	17	-	-
Arizona border town	9	24	29	-	-	-	-	100	-	21	20	25	-	-	-	12	-	-	33	-	-	9	-	-	8	50	-
Other off reservation town	-	-	-	14	-	-	-	-	-	-	-	-	17	100	-	6	-	-	13	33	-	9	-	-	33	-	-
Other	-	-	-	14	-	-	-	-	-	4	-	-	-	-	-	38	100	-	-	33	-	46	-	-	25	50	-
Total	100	101	100	100	100	-	100	100	-	100	100	100	101	100	-	100	100	-	99	99	-	100	100	100	100	100	-
n	45	17	7	7	1	-	7	1	-	28	10	4	6	1	-	16	1	-	15	3	-	11	4	2	12	2	-
Not applicable	13	41	51	26	33	34	3	10	11	29	48	54	18	23	24	19	34	35	8	20	23	22	29	31	19	29	31
No information	2	2	2	3	2	2	1	-	-	1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-
N		60			36			11			58			24			36			23			33			31	

Table 50: Number of Locations at Which Groceries are Purchased
(in percent)

	Red Lake				Black Mesa				Lechee G. D.			
	1	2	3	4	1	2	3	4	1	2	3	4
Trading post	77	39	56	-	51	55	30	-	64	-	-	-
Reservation town	7	19	22	-	43	15	30	14	-	-	-	-
Page	8	8	-	-	3	-	-	-	27	100	67	-
Arizona border town	8	35	22	100	3	10	10	57	-	-	33	-
Other border towns and more distant towns	-	-	-	-	-	20	30	29	-	-	-	100
Other	-	-	-	-	-	-	-	-	9	-	-	-
Total	100	101	100	100	100	100	100	100	100	100	100	100
n	60	26	9	2	35	20	10	7	11	7	6	1
Not applicable	-	34	51	58	-	15	25	28	-	3	3	6
No information	-	-	-	-	1	1	1	1	-	1	2	4
N	60				36				11			

Table 50: Number of Locations at Which Groceries are Purchased (continued)
(in percent)

	Tuba City				Kayenta				Lechee Chapter				Route 89				Page				Power Plant			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Trading post	-	-	-	-	-	-	-	-	-	15	12	-	30	17	20	-	-	6	-	-	3	-	80	100
Reservation town	71	63	43	-	54	29	-	-	6	-	-	-	-	-	-	-	9	-	-	-	10	22	-	-
Page	-	-	-	-	-	-	-	-	86	69	38	-	65	67	-	100	64	44	25	-	42	44	-	-
Arizona border town	29	34	43	100	4	21	75	-	3	8	50	50	4	17	80	-	15	19	-	-	26	11	-	-
Other border towns and more distant towns	-	2	14	-	42	50	-	-	3	8	-	50	-	-	-	-	6	19	50	-	19	11	20	-
Other	-	-	-	-	-	-	25	-	3	-	-	-	-	-	-	-	6	12	25	-	-	11	-	-
Total	100	99	100	100	100	100	100	-	101	100	100	100	99	101	100	100	100	100	100	-	100	99	100	100
n	58	41	7	1	24	14	4	-	36	26	8	2	23	12	5	1	33	16	4	-	31	9	5	3
Not applicable	-	16	50	56	-	10	20	24	-	6	23	28	-	10	15	18	-	17	29	33	-	17	21	22
No information	-	1	1	1	-	-	-	-	-	4	5	6	-	1	3	4	-	-	-	-	-	5	5	6
N	58				24				36				23				33				31			

Table 51: Number of Locations at Which Clothes are Purchased
(in percent)

	Red Lake		Black Mesa		Lechee G. D.		Tuba City		Kayenta		Lechee Chapter		Route 89		Page		Power Plant	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Trading post	70	28	31	13	62	25	-	-	-	8	7	7	32	12	3	-	4	10
Reservation town	12	16	26	20	-	25	61	56	42	-	-	-	-	-	-	-	7	-
Page	8	8	3	-	38	25	-	-	-	-	30	14	23	12	34	21	11	10
Arizona border town	10	48	17	27	-	-	39	44	8	33	30	57	23	38	22	21	39	30
Other border towns and more distant towns	-	-	23	33	-	25	-	-	50	58	33	21	23	38	38	53	39	50
Other	-	-	-	7	-	-	-	-	-	-	-	-	-	-	3	5	-	-
Total	100	100	100	100	100	100	100	100	100	99	100	99	101	100	100	100	100	100
n	59	25	35	15	8	4	57	25	24	12	30	14	22	8	32	19	28	10
Not applicable	-	34	-	20	-	2	-	32	-	12	1	15	1	11	1	14	1	17
No information	1	1	1	1	3	5	1	1	-	-	5	7	-	4	-	-	2	4
N	60	60	36	36	11	11	58	58	24	24	36	36	23	23	33	33	31	31

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